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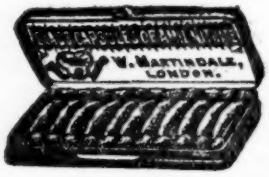

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An Address ON LETHARGIC ENCEPHALITIS.

Delivered before the Medical Society of London on Dec. 9th, 1918,

BY E. FARQUHAR BUZZARD, M.D. OXON., F.R.C.P. LOND.,

TEMPORARY COLONEL, A.M.S.; PHYSICIAN TO OUT-PATIENTS, ST. THOMAS'S HOSPITAL AND NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, ETC.

MR. PRESIDENT AND GENTLEMEN,—A great deal has already been written and said about the epidemic of encephalitis which prevailed in this country during the spring and summer of this year. As a result of your personal observation and of reading what has been written by others you are doubtless fully acquainted with the outstanding features of the disease as it presented itself in its characteristic form. I should probably be wasting both your time and my own by describing its ordinary clinical manifestations, or even by describing once again the pathological appearances which have been observed in fatal cases.

When an epidemic of this kind occurs, and when its immediate results and effects have been thoroughly studied, it is well worth while to collect the facts which have come to our knowledge and to see how far they are of practical importance and how far they may be able to throw light into corners of pathology which hitherto have been poorly illuminated. It appears to me that this epidemic has taught two lessons, both of which should be of value to the medical profession, and one of which is very instructive to those of us who are especially interested in neurological problems.

A MEDICO-LEGAL CASE.

In the course of my practice I have been struck on many occasions by the fact that the medical profession has never sufficiently realised that encephalitis, or inflammation of the brain, is a condition which is by no means uncommon, and, if you will allow me, I will tell you a story to support this contention.

Some years ago I was asked to examine a lad of 14 on behalf of an insurance company in regard to what was alleged to be the effect of an injury arising out of his employment. The facts, which were admitted on both sides, were briefly as follows. This lad was employed in doing odd jobs by a builder, and it so happened that on one occasion he was told to carry a hod of mortar up a few steps, which he did without difficulty and without immediate consequences. He was a big, strong lad of 14, and the hod of mortar only weighed a few pounds, but it happened that in the course of the next 24 hours the boy became ill, developed a temperature, suffered from severe headache and vomiting, became delirious and unconscious, and at the end of a few days' illness was found to be completely paralysed on the left side of his body. The acute symptoms rapidly passed off, the hemiplegia cleared up to a certain extent, but the arm was so badly paralysed that it was practically a useless limb. This occurred in the month of October, and some months later I was called upon to give evidence in a county court on the question of whether the boy's hemiplegia was the result of an injury or whether it was due to natural causes. The case was tried by a judge, with the assistance of a medical assessor, and I put forward the view that this was an ordinary case of encephalitis, occurring during the season when encephalitis is usually prevalent, and attacking a young subject, as it usually does. The medical assessor began by asking me what encephalitis was, and I told him that it was an inflammation of the brain. He then asked me what was the cause of the inflammation, and I explained that as far as our knowledge went the cause of this form of encephalitis was a microbe identical with that which causes poliomyelitis, and I gave him some of the facts known to us which supported this view. That my explanation did not convey very much to his mind was shown by his next question, which was: "How do you account, Dr. Buzzard, for the microbe being on the spot exactly at the right time?" It is needless to add that the verdict was against the insurance company, and that the paralysis was judged to be the result of an injury.

ENCEPHALITIS DUE TO THE VIRUS OF POLIOMYELITIS.

But there is another way in which one realises that the diagnosis of encephalitis, especially in regard to the diseases of early infancy and childhood, appears never, or very rarely, to be considered as a possibility. We are constantly hearing the story of patients who are brought to us on account of epilepsy, of mental deficiency, or of hemiplegia that their disabilities have dated from an illness occurring in the first few years of life, and on inquiry into the symptoms of that illness one generally finds that a healthy child has been suddenly taken ill with convulsions, fever, vomiting, &c., and that the diagnosis of meningitis, or gastritis, or teething has usually been made. I am quite convinced from my own experience that a large number of cases of epilepsy, of mental deficiency, of hemiplegia, and of diplegia are the permanent results of attacks of encephalitis occurring in early childhood, and that this large group of cases can be properly attributed to the virus of poliomyelitis. It is unnecessary to dwell upon the reasons which support this view, but they are based largely upon the observations which have been made during the epidemics of poliomyelitis occurring in this and other countries, and in which cases where the inflammation has affected the brain are intimately associated with cases in which the inflammation has affected the spinal marrow, and with still further cases in which the inflammation has affected the whole of the central nervous system, as proved by clinical observation and by post-mortem examination. After all, the brain is a large and important organ, and it would be surprising if inflammation of that structure was not of fairly common occurrence. For years I have urged the view that disease of the brain or spinal cord produced by the virus of poliomyelitis should be regarded in the minds of the profession as one of the acute specific fevers, and especially as one of those acute specific fevers which have a special incidence upon infants and children. It is well known that the susceptibility to this infection decreases as age advances, and, personally, I have met with only a few cases after 25 years of age and none after the age of 40 has been reached.

There are other forms of encephalitis which are met with at much rarer intervals. It is an occasional complication or sequela of typhoid fever. It may possibly be produced by the virus of influenza, and, as we have learnt only too well in recent years, it is a common and fatal complication in cases of head injury.

From the ordinary practice point of view, therefore, it is well to remember that there is a form of encephalitis which has the constitutional disturbances, the age-incidence, the seasonal exacerbations, the sporadic and epidemic types and the immunity from second attacks which are shared by measles, scarlatina, and other acute specific fevers, and that it presents an inflammatory lesion of a particular tissue in the same way as typhoid fever, diphtheria, and small-pox display inflammatory lesions of other tissues. This form of encephalitis has been shown to be due to the virus of poliomyelitis and it should be noted that the disease is an acute one running its course in a few days, but often leaving permanent results in the form of paralyses, mental defects, and epilepsy.

THE RECENT EPIDEMIC.

We must now turn our attention to the consideration of that form of encephalitis which has attracted notice this year, and which undoubtedly is an entirely different disease from the encephalitis I have just referred to. It is true that there have been in the recent epidemic a few cases which have run a very malignant and rapidly fatal course of a few days, but the striking feature of the majority has been the fact that a careful history shows that symptoms have often been present over a period, not only of days, but even of weeks before the intensity of the process has reached its height. A study of the cases also shows that the age-incidence and the seasonal incidence are entirely different from those of poliomyelitis. Putting aside clinical and pathological differences, the epidemiological data collected by Colonel S. P. James are quite sufficient to prove that lethargic encephalitis is a distinct disease.

You will remember that the attention of the profession was drawn to this epidemic[1] by Dr. Wilfred Harris in London and by Professor A. J Hall in Sheffield, and that both these observers were struck by the number of cases brought to their notice suffering from asthenia, lethargy, and disorders of ocular movements such as strabismus, diplopia, nystagmus, and ophthalmoplegia. These were patients suffering

[1] THE LANCET, April 20th, 1918, p. 568.

from encephalitis with its chief incidence on the brain stem.

This important discovery was quickly followed by the realisation that there were other patients taken ill in the same way, presenting the same constitutional disturbances, the same asthenia and lethargy, but displaying no oculomotor signs or symptoms. On the contrary, they gave us the clinical picture of acute paralysis agitans; the mask-like, expressionless face, the rigid but not really paralysed limbs, the tremor, the posture, and gait of that disease. I shall never forget my first experience in that direction, when I was asked to see a man lying in bed, looking exactly like a patient who had suffered from Parkinson's disease for 10 or 15 years, and was informed that he had been ill a week! Here we had examples of the encephalitis with its chief incidence on the basal ganglia, and in particular, perhaps, on the globus pallidus.

CASES IN WHICH THE CEREBRAL CORTEX IS CHIEFLY AFFECTED.

It is not my intention to dwell further upon these two groups of cases at present. They have been already sufficiently and adequately described. I propose to confine my attention to the consideration of a third group of patients in whom the force of the inflammation was spent upon the cerebral cortex, and who gave rise to considerable difficulty in diagnosis, especially in regard to the possible presence of cerebral tumour, cerebral abscess, or cerebral hæmorrhage. It is necessary to give you quite briefly an account of a few cases if I am to emphasise the lessons which can be drawn from them.

CASE 1.—On April 5th, 1918, I saw, with Dr. Granger Evans, a lady, aged 54, who, on Thursday, March 28th, noticed that her right hand was rather shaky. The next day she went away for the Easter holidays, but returned on the Sunday on account of the uncontrollable jerking of her right arm and hand, which gradually became worse and spread to the whole of the right side. When I saw her on April 5th there was a mixture of clonic and tonic spasm affecting the whole of the right side, with considerable impairment of voluntary movement and more or less complete aphasia. The reflexes on the affected side were of the usual hemiplegia type, whilst those on the left side were normal. There were a few movements noticed in the left arm, but there were no cranial nerve disorders beyond the weakness of the right side of the face. There was no optic neuritis, and nothing in the cardio-vascular condition of the patient to explain the symptoms.

I saw this patient again on April 22nd, and learnt that the movements had ceased soon after my last visit, but that she had become completely hemiplegic on the right side, completely aphasic and incontinent. She appeared to be perfectly conscious although unable to say a word or to make much response to orders. About a fortnight later she was admitted into the National Hospital, Queen-square, where she gradually became more comatose and died on May 9th, exactly six weeks from the onset of her illness. The early stages of this illness were afebrile and no abnormal condition was found in her heart, lungs, or kidneys. During the last few days of life her temperature varied between normal and 102° and at that time there was some albuminuria.

At the post-mortem examination the surface of the brain was noticeable for the presence of some dark reddish-brown staining in the subarachnoid space evidently due to slight hæmorrhage on the surface of the cortex. This was most marked over the parietal lobe on the left side, but there were small patches scattered here and there in other parts of both hemispheres. Sections of this brain presented all the characteristic appearances of a hæmorrhagic encephalitis without the occurrence of any large hæmorrhage.

The notes of the next case are as follows:—

CASE 2.—The case is that of a lady whom I saw on May 6th, 1918, with Dr. T. H. Brown. She was 44 years of age and complained that she had not been feeling well for some time, but had had nothing particular to complain of until Thursday, May 2nd, when she had some difficulty in doing her work owing, as she explained, to a deficiency in her mental grasp. On the following day she displayed some awkwardness and clumsiness in her right hand, and on the third day the whole of the right arm was weak. On this day she had an epileptic attack, involving and confined to the right side of the body, and this attack was repeated at intervals on the Sunday and Monday, with the result that she became more and more hemiplegic, more aphasic, and distinctly drowsy. She vomited on one occasion.

On the Monday evening when I saw her she lay in bed in a lethargic condition unable to speak, but evidently able to understand some commands, and able to indicate when she wanted to perform natural functions. She was taking her food well, and had little or no rise of temperature. On examination I found complete right hemiplegia with the usual reflexes, and I also satisfied myself that there was some right hemianæsthesia and complete right hemianopia. Her condition remained much the same during the next two days, and a lumbar puncture was performed, the fluid removed being at increased pressure but quite clear, and on microscopical examination normal in its cytology. The Wassermann reaction was negative. At this time she appeared to be suffering from severe headache, and on Thursday midday she was distinctly more stuporose, had become incontinent, was swallowing with difficulty, and showed some tendency to ptosis in both eyes. For the first time the optic discs showed slight swelling and blurring of the upper and inner edges.

She was obviously suffering from increased intracranial pressure, and it was decided to do a decompression. This was carried out by Colonel Sargent at 10 o'clock in the evening. She was trephined over the left post-central and temporal regions, and as soon as the bone was removed it was noticed that the dura was bulging, very thin, and easily torn. The brain surface presented a dark purple colour through the dura, and on opening the latter there was found great increase of tension. Shreds of recent clotted blood were scattered about, both beneath the dura and in the subarachnoid space. The cortex was hyperæmic and easily ruptured. The post-central vein was firm and thrombosed, and towards the vertex of the hemisphere the brain matter was deeply blood-stained and partly disintegrated. A sample of blood was taken up in a sterilised pipette for culture purposes, but nothing was grown from it. The patient died the following morning and the post-mortem examination was made the next day.

This brain on removal had on casual inspection the appearance of one from a case of cerebral hæmorrhage, but closer investigation revealed the presence of thrombosed veins on the surface of the left hemisphere and one or two patches of what looked like hæmorrhagic infarction on the opposite side. After hardening, sections through the organ showed the presence of widespread encephalitis confirmed by microscopical examination. When I say widespread I do not mean that all parts of the brain were equally affected, and it has been characteristic of most of these cases that the inflammation has been patchy in its distribution, although there has generally been one large focus where the process has been most intense and most hæmorrhagic.

The account I have just given you of this case is particularly interesting when compared with Case 3.

CASE 3.—I saw a gentleman at Reading with Sir Robert Fox-Symons and Dr. W. B. Secretan on July 24th. His age was 58, and he had always enjoyed good health until about three months before I saw him, when he began to show forgetfulness and to do odd things, such as leaving off an article of his usual clothing. About the same time he began to complain of headache. For about a month there must have been some difficulty of sight, as his attempts to play croquet—at which he had been quite good—had become laughably bad. On Thursday, July 18th, he had stayed away from business, not feeling well, and on Saturday he vomited incessantly and complained of severe headache and pains in his legs. His temperature was about 100° on Saturday and Sunday, and on Monday he became distinctly worse, more drowsy, and somewhat aphasic. On this day Dr. Secretan detected right hemianopia.

When I saw him on the Wednesday he was lethargic and obviously very ill. His pupils were active. Both discs were slightly swollen with engorged veins, but no marked neuritis. There was complete right hemianopia associated with object blindness. He was quite unable to name objects, although he seemed to appreciate what they were when he saw them. If a key was put into his right hand he used it in a normal fashion, but he could not name it. When I suggested "key" he appeared to assent. He had obvious difficulty in understanding what was said to him and made mistakes in carrying out orders. His temperature was then normal. There was no actual paralysis, the knee-jerks were rather sluggish, the right being more brisk than the left, and on the right side an extensor response could be elicited. The blood and cerebro-spinal fluid were examined. The blood-count was practically a normal one and there was certainly no marked degree of leucocytosis. The cerebro-spinal fluid contained a considerable quantity of blood and in addition there were some cells showing fatty degeneration which were not of blood origin.

The patient showed no signs of improvement and it was decided that an operation for the removal of pressure should be undertaken. This was carried out by Colonel Sargent on August 1st, when he exposed the brain in the left post-central and occipital regions. Intracranial tension was increased, and the dura before being opened looked plum-coloured and opaque. When incised it appeared that there had been slight patchy hæmorrhage between its layers, and the cerebral surface was stained yellow. Blood was present in small quantities between the dura and the pia mater, here and there as a thin film and clot, elsewhere as darkish fluid blood. The fluid part had evidently sunk down towards the base, for on retracting the lower part of the exposed brain dark blood welled up in considerable quantities. The convolutions were flattened and pale, and here and there there were lengths of thrombosed cortical veins. Just below the posterior end of the first temporal convolution was a spot which showed considerable softening, but there was no evidence of tumour or abscess anywhere.

The patient stood the operation well, but was very restless during the following night and later became almost maniacal. He began to refuse food and his bladder had to be emptied by catheter for a couple of days. The headache was much relieved by the operation, but the patient gradually become more comatose and died about ten days later. There was no post-mortem examination in this case, but I can hardly entertain any doubt as to the diagnosis of lethargic encephalitis in view of the clinical history and of what was seen at the operation.

The details of my fourth fatal case of encephalitis can be given very briefly.

CASE 4.—The patient was a man of about 50 years of age, whom I saw on Sept. 15th of this year with Dr. Harvey Norton. There was a history that early in August when working in a field in the country he had fallen down unconscious, had been delirious for a few hours, was seen by a doctor who diagnosed sunstroke, and that he continued to complain of headache and vertigo. He remained in a stationary condition until about Sept. 13th, when he was seized with very severe pain in the head, had several epileptiform convulsions, and on examination presented evidence of slight hemiplegia and some hemianopia. He was drowsy and difficult to examine, but he showed no signs of cardio-vascular disease and his optic discs presented no change. The urine was normal. He was moved into St. Thomas's Home on Sept. 16th and a lumbar puncture was performed on the same day. Very soon after this operation he had a general convulsion and died quite suddenly.

The post-mortem examination was made the next day, and the pathologist coming away from it told me that he had found a cerebral hæmorrhage. The brain had been cut up, but I was not satisfied that cerebral hæmorrhage was the whole diagnosis, and I removed portions from several parts for microscopical examination. It was noticeable that there were no signs of arterial degeneration from the naked-eye point of view.

DISCUSSION OF CASES.

The story of these four cases, coming so close together, appears to me to be one of unusual interest. You will notice that all four patients were over 40 years of age, but that none of them presented cardio-vascular changes suggesting the possibility of cerebral hæmorrhage as a diagnosis. In none of the four cases did the clinical history conform closely to that of cerebral hæmorrhage, but suggested some more subacute lesion, and naturally gave rise to the question of abscess or syphilitic thrombosis. In all four cases the Wassermann reaction of the cerebro-spinal fluid was negative. The lesson I have learnt from this experience is that patients over 40, and even over 50, years of age may be the victims of encephalitis, producing the general symptoms of hemiplegia, aphasia, hemianæsthesia, or hemianopia. In the second place, I have learnt that a naked-eye examination of a brain on a post-mortem table is not sufficient to discriminate between an ordinary cerebral hæmorrhage and a hæmorrhage which is only an accidental occurrence in the course of an encephalitis. It teaches us that when there are no obvious gross signs of disease in the cerebral arteries to account for a hæmorrhage it is essential that microscopical investigation should be carried out in order to determine the cause for the blood extravasation. Thirdly, we must look on the presence of thrombosed cortical veins associated with hæmorrhage in the neighbouring brain substance as strongly indicative of an inflammatory process.

There is no reason to suppose that lethargic encephalitis is a new disease, and we may justifiably assume that endemic cases occur from time to time. Most of us can recall patients suffering from symptoms of acute or subacute cerebral disease, in connexion with whom a hesitating diagnosis of cerebral hæmorrhage has been made, and others again of whom a diagnosis has never been properly established. This recent epidemic is of practical importance in that it ought to bring the possibility of encephalitis more prominently before our minds in cases of cerebral disease presenting difficulties in diagnosis. At the moment this realisation may not be of much practical importance, because we are not yet in a position to say what is the nature of the infection, or to point to any method of treatment likely to abort or cure the disease. The experience of these four cases, however, leads me to think that operative intervention in the way of decompression is really contra-indicated, in spite of the presence of increased intracranial tension. Three of these patients died partly, at any rate, from hæmorrhage, and it is hard to believe that decompression can be beneficial when this hæmorrhagic tendency exists.

Prognosis.—Further experience may teach us more about the prognosis in this disease. At present we can only say that some cases recover completely, others survive the acute stage, but carry with them in after life permanent defects due to the morbid process, while a certain number die either from toxæmia or hæmorrhage in the acute illness or from some complication following it.

Microscopical study of the pathological lesions which were found in the brains of the patients whose histories I have given shows the remarkable way in which the vessels of the brain react in this inflammatory process. The chief features are: (1) Perivascular infiltration mainly with small round cells; (2) small capillary hæmorrhages which suggest a gradual oozing of blood through the damaged walls of small veins and capillaries; (3) thrombosis of small and middle-sized vessels in different stages of organisation; (4) ischæmic softenings presenting the appearance of the hæmorrhagic infarction which one sees in other organs; (5) subarachnoid hæmorrhages and cellular infiltration of the lepto-meninges: (6) general neuroglial proliferation; (7) changes in nerve cells, in some places showing chromatolysis and in others a process resembling that of coagulation-necrosis.

A case of lethargic encephalitis which died in the National Hospital from the result of bedsores some months after the acute attack also illustrates the permanent changes in the blood-vessels which have resulted from the acute inflammatory process in the earlier stages of the disease.

Finally, I should like to express my indebtedness to Captain J. G. Greenfield, who has prepared many of the sections and taken all the photographs, and to Captain H. B. Weir, who also assisted me in some of the pathological investigations.

Some of the expenses connected with the pathological examinations have been defrayed by the Medical Research Funds.

LETHARGIC ENCEPHALITIS:*

NOTE ON ITS DISTRIBUTION IN ENGLAND.

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IN THE LANCET of Nov. 2nd, p. 590, is a report of the discussion at the Royal Society of Medicine on encephalitis lethargica. Among the contributions was a brief summary, which Sir Arthur Newsholme had authorised me to give, of the results of an inquiry on the disease recently carried out by the medical staff of the Local Government Board, in collaboration with the Medical Research Committee. For the epidemiological section of the investigation the material considered consisted of 107 cases in the London area and 121 cases in the provinces. In the accompanying maps the distribution of the disease is shown, as well as that of "poliomyelitis."

General Distribution.

Of the cases considered in this note one or more were reported from 51 sanitary districts in the following counties: Middlesex, Essex, Surrey, Kent, Oxford, Chester, Norfolk, Stafford, Leicester, Warwick, Wilts, Salop, Derby, Yorks, Lancs, Notts, Durham, Carnarvon, Monmouth. From one or two other counties there were reported a few cases which we did not consider sufficiently typical to be included for consideration here. Except in London, where 55 cases were distributed about evenly over 22 sanitary districts, the number of cases reached double figures in Birmingham, Sheffield, and Leicester only. These observations indicate the wide and sparse distribution of the malady in the country generally.

Local Distribution.

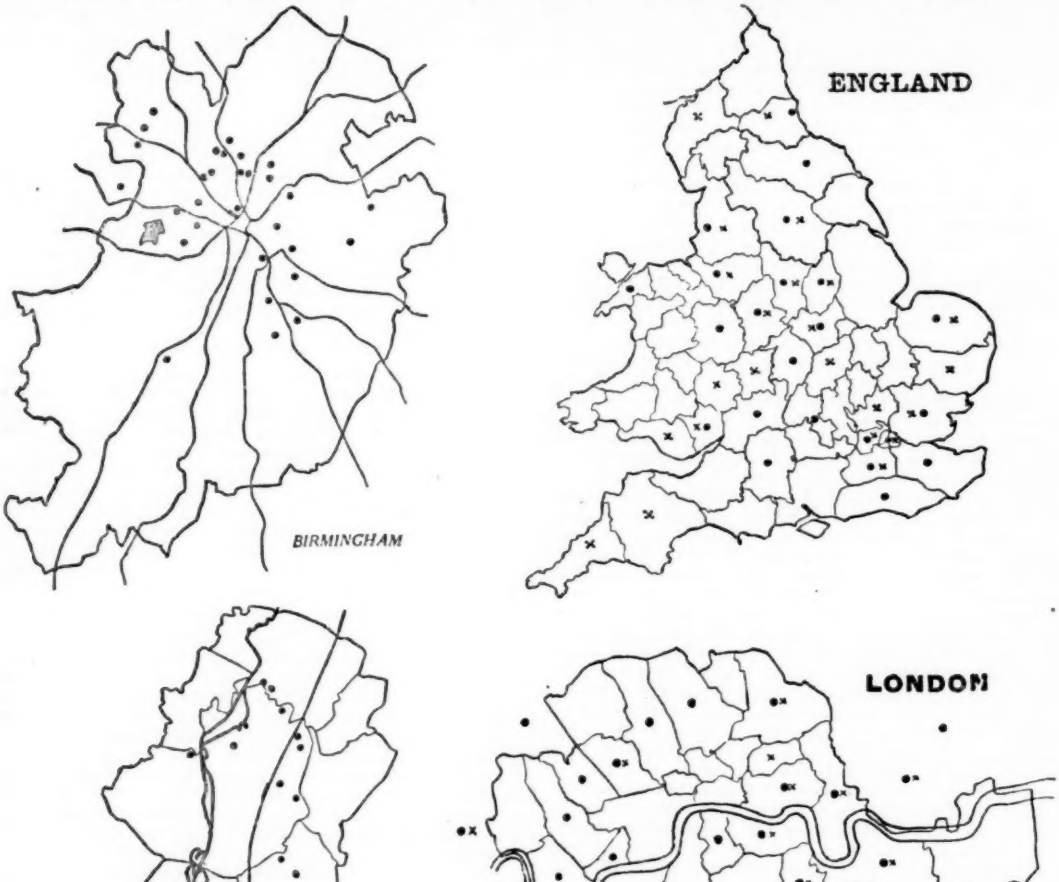
The local distribution of cases in London, Birmingham, and Leicester is shown on the small outline maps. Dr. S. Monckton Copeman, F.R.S., personally visited all the patients in the two last cities, and found that in neither was the incidence limited to any particular area, but that the cases were thinly scattered over various districts. Dr. Thomas Carnwath found that in Tredegar the cases were distributed here and there in an irregular manner, and the same is true in the affected sanitary districts in London. On the other hand, Dr. A. S. MacNalty, during a local inquiry in Stoke-on-Trent, found in a comparatively small area of the Burslem district five patients who were suspected to be suffering from the illness under consideration, and, although no connexion between any of these cases could be traced, they appeared to be a localised group. Unfortunately, three of these cases had to be excluded from the list of cases on which the present observations are based, as the localising signs which had been laid down as typical of the "new syndrome" were not present. In another inquiry at Mansfield, Dr. MacNalty found in the town only four cases which might be examples of the "new syndrome," and of these three were children in the same family. Two of these patients died without any localising signs; the third, who recovered, had slight ptosis, but no ophthalmoplegia. As the differential diagnosis between the "new syndrome" and "poliomyelitis" remained uncertain in all four cases, they were also excluded from the list.

Although careful local inquiries in a number of affected places were made, the observation at Mansfield, just noted, was the only instance in which there was a suspicion of more than one case of the "new syndrome" having occurred in any house or family.

Before comparing the general and local distribution of the illness under consideration with that of "poliomyelitis" for the same period, I may note a general conclusion which seems to be justifiable from the above summary. It is that, having in mind the number of inhabitants in the localities where instances of encephalitis lethargica have been found, it would appear that in all of them the occurrence of a case of the disease is a rare event which, in the absence of a reason for particular search, might pass unnoticed. The summary of distribution shows, however, that in the presence of such a stimulus a few isolated cases having no apparent connexion with one another were discovered almost simultaneously in widely separated parts of the country. This suggests, first, that we have to do with an illness of which

* Summary of a paper read at a meeting of the Royal Society of Medicine.

Outline Maps showing the Distribution of Encephalitis Lethargica and Acute Poliomyelitis.



The dots indicate encephalitis lethargica, and the crosses acute poliomyelitis. In England are shown the counties in which there were cases of the two diseases, while in London this information is given for the sanitary districts.

the sources of origin are indigenous rather than new or imported; secondly, that the outbreak may be one of an unusual number of "sporadic" cases, rather than one brought about by epidemic spread. If this is true it is not surprising that the intensive inquiries made in the affected localities quite failed to reveal the source of origin of any case, or to indicate even a remote connexion between the different cases.

Comparison of the Distribution with that of "Poliomyelitis."

Returning now to the solution of our problem whether the illness is or is not a form of acute poliomyelitis, a comparison of the distribution of cases in the selected groups of the "new syndrome" and of "poliomyelitis" should be of material assistance. The line of reasoning that is justifiable is somewhat as follows:—

(*a*) The illness under consideration has been found to be a severe and often fatal disease. Therefore, if it be a form of acute poliomyelitis it must be a severe and often fatal form such as would not be likely to occur except in places where acute poliomyelitis is prevalent and active.

(*b*) It follows that if we find the "new syndrome" to be prevalent in places where acute poliomyelitis is rare, and especially if it is prevalent in a place where by careful search cases of acute poliomyelitis cannot at the time be found, we may conclude, with a considerable degree of probability, that the "new syndrome" is not a form of acute poliomyelitis.

The following are some results in this connexion:—

1. Between January and June this year cases of the ordinary spinal form of poliomyelitis, with limb paralysis, were officially notified from some 47 sanitary districts. In those districts, therefore, the virus of acute poliomyelitis had not changed its usual pathological effects; and as it had not done so in those districts it is probable that it had not done so in the rest of England.

2. Of the 51 sanitary districts from which cases of the "new syndrome" were reported, there were 26 in which a case or cases of acute poliomyelitis also occurred between January and June this year, but there were 25 in regard to which there was no evidence of the occurrence of a case of that disease.

3. In Stoke-on-Trent, Mansfield, and some other places, special inquiries failed to bring to light that any case of the usual form of acute poliomyelitis had occurred during the six months of the present year; and even in such great cities as Birmingham and Manchester there were only two or three cases in each, and these not in association with the cases of illness under consideration. In London the distribution of the "new syndrome" and of "poliomyelitis" by sanitary districts is shown on the outline map.

On the evidence just presented it appears (1) that cases of the "new syndrome" have occurred in places in which cases of true poliomyelitis could not at the time be found; and (2) that they have occurred in places where the latter disease, though present, has been rare at the time of discovery of the "new syndrome" cases.

THE PRACTICAL SIGNIFICANCE OF THE MASS-REFLEX

IN THE TREATMENT OF INJURIES OF THE SPINAL CORD.

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IN 1917 a condition was described in certain cases of grave injury of the spinal cord which was called the "mass-reflex."[1] The presence of this widespread reaction introduces many difficulties in the nursing and treatment of the afflicted patients. These, however, can be met if the phenomenon and the principles underlying its production are understood.

I.—*The Phenomenon.*

For a period, varying in uncomplicated cases from a few days to three weeks after the incidence of the spinal injury, the spinal cord distal to the lesion is under the influence of "shock." There are flaccid paralysis of skeletal muscles and loss of sensation in the affected regions of the body. The limbs lie motionless on the bed. The functional activity of all reflex arcs of the isolated segments of the cord is almost completely abolished. There is retention of urine and fæces, due probably, in the main, to tonic contraction of the internal sphincters, which are innervated by the sympathetic nervous system. The skin is dry. This has been called the "stage of flaccidity."[2]

As the effects of spinal shock pass off reflex excitability returns; the paralysed muscles recover tone, the bladder expels its contents at intervals, the rectum becomes automatic in its action, and an area of skin, varying with the level of the spinal lesion, may begin to sweat. This is the "stage of reflex activity."

Now in a well-defined group of cases, especially where the spinal cord has been completely divided, a nocuous stimulus, such as a scratch or a prick, applied to any paralysed part evokes a flexor spasm. This consists of flexion at hip and knee, dorsiflexion at the ankle, and an upgoing movement of the toes, together with flexion of the trunk from contraction of the muscles of the abdominal wall, provided the lesion is high enough. With a stimulus of moderate strength it is, as a rule, bilateral, and if the stimulus is applied to a part in the middle line of the body, such as the penis, perineum, or bladder, both lower limbs flex simultaneously and the muscles of the anterior abdominal wall contract as a whole. Following the spasm the trunk and limbs resume their former posture, not from contraction of the extensor muscles, but from relaxation of the flexors and the action of gravity. So far as the trunk and limbs are concerned, it is a uniphasic movement of violent nature in which the flexor muscles only are actively involved. Moreover, the energy evoked by the stimulus overflows into channels with which the reflex manifestations are not associated normally. Stimulating the sole of the foot aids evacuation of the bladder, and may be followed by an outburst of sweating from the skin over an area corresponding to the level of the spinal lesion. Conversely, automatic evacuation of the bladder or rectum may evoke a flexor spasm. This is the "mass-reflex." Stimuli capable of eliciting it are generally of nocuous character, such as pricking or grasping the limbs; but if reflex excitability is high such gentle stimulation as that produced by light friction or by the removal of the bedclothes may be followed by a flexor movement so sudden and vigorous as almost to jerk the patient out of bed. The parts in which the threshold is lowest are the terminal regions, the soles of the feet, the external genitals, and the anal region.

II.—*The Principles Underlying it.*

One of the dicta of Hughlings Jackson was that in disease there are a negative and a positive aspect. Applied to the cases of injury to the spinal cord under consideration, loss of control of higher centres over the lower centres in the spinal cord corresponds to the negative effect, and the diffuse reflex response corresponds to the positive effect. The presence of this massive reaction indicates a low grade of neural control. A stereotyped set of movements can be evoked from a large receptive field comprising both somatic and visceral regions. There is little tendency to modification in form according to the locality of the stimulus. What Sherrington has called the "local sign" of a reflex is almost entirely absent. The anchored body has one reaction to a nocuous stimulus only, a violent withdrawal from harm. A primitive defensive reaction is all that remains.

Why does this overflow of reflex activity occur in some cases of gross injury to the spinal cord and not in others, although interference with the functions of the cord may appear, at first sight, to be equally severe? There may be complete loss of sensation and of voluntary power in the affected parts of the body in the two groups of cases, and yet in the one the mass-reflex is present and in the other it is absent. On the other hand, the patient may be able to move his limbs in some degree and may be conscious of alterations in the posture of his legs and of other sensory impulses, he may be able to tell with accuracy when his bladder is full, and yet this massive reaction may be evoked on one side and not on the other.

It has been shown[2] that when the muscles exhibit "postural tonus" (Sherrington[3]), and when certain reflex reactions can be elicited, indiscriminate activity in the spinal cord distal to the lesion disappears, and the massive reaction ceases to be obtained with stimuli of moderate intensity. In these reactions extension of the lower limbs, as a whole, can be evoked. When the sole of the foot is scratched there is no longer a violent flexor spasm of the lower limbs and trunk, with evacuation of urine and excessive sweating. The irritated limb withdraws from the nocuous stimulus, it is true, but in a more controlled way; the contra-lateral lower limb extends, and the abdominal wall takes no part in the motor effect. The flexed limb may then extend and the other flex, and so on for some time, the feet moving up and down rhythmically and in opposite phase. These movements resemble closely those of progression. Flexion occurs not only as a simple withdrawal movement, but takes part in a biphasic reaction, which may be the remnant of the ancient mechanism for escape from harm. Further, the amount of moisture on the skin is not altered by the reflex, and the bladder is unaffected. The spinal cord behaves in a more restrained and discriminative fashion. Stimulation of the thigh, or pressure on sole of the foot, is followed by extension of the limb, and not by a massive flexor response, and irritation of the penis elicits a reflex reaction which is adapted to an obvious end.

In a patient in whom these primary extension reflexes can be obtained the nervous mechanism of the bladder and sweating can no longer be influenced by somatic stimuli of ordinary intensity; and, on the other hand, evacuation of urine does not initiate movements in the limbs or trunk.

Control of spread of impulses within the spinal cord is thus associated with activity in the extensor reflex arcs, with biphasic movements of the limbs, and with the presence of "local sign" in the reflexes, by which is meant variation in the reflex manifestation with the locality of the spot stimulated. A higher grade of neural activity is manifest, and what can be interpreted as choice and discrimination becomes evident even at this low evolutionary level of the central nervous system.

In the frog the "centres" of the extensor reflex arcs lie in the spinal cord; in the dog they are situated partly in the spinal cord and partly in the medulla and pons (prespinal). In man the control is relegated in most cases almost entirely to "centres" in the brain-stem, belonging probably to the cerebello-pontine system. I hope, however, to give evidence in a future paper to show how even the isolated spinal cord in man may sometimes resume its ancient postural functions after a long period of freedom from higher control.

III.—*The Practical Significance of the Mass-reflex.*

It becomes a matter of great importance for the comfort and proper nursing of these patients to consider how the mass-reflex affects them.

(*a*) *The bladder.*—The ease with which impulses spread in the spinal cord, influencing all the reflex arcs, is in most ways the cause of great inconvenience to the patient and of innumerable difficulties in nursing. But in the treatment of the paralysed bladder it can be taken advantage of and sometimes a valuable aid.

It is of the utmost importance to stop catheterisation as early as possible, as it undoubtedly forms the greatest risk to infection of the bladder, and the bladder holds the key to life and death for the patient. Every possible precaution should be taken to avoid the dangers of urinary sepsis, and as soon as the bladder has begun to evacuate its contents automatically it follows that if catheterisation can be stopped a great advantage is gained. But at this time the automatic action of the reflex arcs is still imperfect and a residuum is left. This forms a favourable nidus for organismal growth and must be removed. In the mass-reflex we have a solution to the problem. It should be ascertained at what interval the bladder "fires off" in each particular patient. It may be every two hours or every four hours, the time varying considerably in different patients, but remaining fairly constant for each case provided no febrile complication arises. About the time when the bladder is due to evacuate the nurse or the orderly or the patient himself can evoke a flexor spasm by stimulating the abdominal wall or lower limbs. In this way the reflex activity of the bladder is facilitated and reinforced, with the result that all the contents will be voided. The bottle can then be emptied after each act, and the risk of wet beds is thereby greatly diminished. The patient can perform the whole process unaided. Knowing the approximate time at which his bladder is due to "fire off," by squeezing his thighs or pressing on his abdomen he can start off a strong reflex reaction which finally empties the bladder entirely. Thus, he can practically at any time empty his bladder by originating and reinforcing in this way the automatic action of the vesical nervous mechanism.

In bed a glass or enamel urinal is best, as it can be properly cleansed, and if these precautions are taken spilling of urine from the bottle caused by flexor spasms need never occur. This is of great importance, as the skin of the buttocks and limbs soon gets abraded if rubbed against wet sheets, and bedsores already existing are hindered from healing. Control of flexor spasms, which pull the patient about in bed, will be described later. When the patient is getting about in a spinal carriage, but more particularly in a ward wheel-chair or in a hand-propelled chair, a rubber bottle strapped round the waist and with a close fitting tube for the reception of the penis is most serviceable, but it has this disadvantage that it is more difficult to clean than is the bed urinal.

(*b*) *Gastro-intestinal conditions.*—To the uninitiated a group of symptoms frequently complained of by patients with dorsal lesions and due to the mass-reflex may be puzzling. After a day of vigorous flexor spasms or during the administration of an enema or catheterisation of the bladder the patient often complains that the abdomen feels distended and uncomfortable—that is, he is disturbed by feelings of nausea and that he cannot take his food. He begs for relief from what he thinks is flatulence, and the whole Pharmacopœia may be tried without avail. The cause of the abdominal discomfort is not gastro-intestinal irritation, but impulses originating from the flexor spasms spreading and exciting the visceral reflex arcs. Attention must be focussed, then, on the control of the spasms. The enema fluid must be injected slowly so as not to distend the rectum unduly. Cleansing of the penis prior to passing the catheter must be done gently and with a non-irritating antiseptic fluid, such as a very weak solution of eusol (1 in 6000 to 8000). The catheter must be inserted slowly and the penis held gently. Irritation of the external genitals is a potent stimulus for evoking the mass-reflex response. In the glans penis the threshold is almost as low as in the sole of the foot. Patients in whom flexor spasms are evoked with stimuli of low threshold value have to be very carefully handled in bed. The position of the limbs least favourable for involuntary movements must be ascertained by the nurse.

On the other hand, the earliest symptoms of an attack of pyelitis are flatulence with abdominal distension and feelings of discomfort referred to the abdomen; but these symptoms are constantly accompanied by more definite loss of appetite and a white furred tongue, and, if visceral sensibility is not abolished in the affected parts, by tenderness on one or both sides on deep palpation of the renal region. The rectus abdominis on the sensitive side is usually more tense than on the opposite side. These symptoms may be present before a rigor or a definite rise of temperature occurs. Impulses orginating from the irritation of the intestinal tract constantly pour into the spinal cord by way of the visceral afferents and evoke vigorous and frequent spasms of the lower limbs and abdominal wall. At such a time treatment must be directed towards the urinary condition primarily and to the gastro intestinal secondarily. Of course, indiscretions in diet lead to abdominal discomfort and to the initiation of violent flexor spasms, and in consequence have to be carefully avoided.

(*c*) *Sweating.*—Excessive sweating is a prominent and distressing feature of the mass-reflex response. The area of skin from which the sweat pours varies with the level of the spinal injury. For, as has been demonstrated,[1] it is the level at which the connector fibres, forming the communication between the spinal cord and the sympathetic nervous system proper, are shut off from the controlling influence of higher centres by the lesion that determines the sudorific area. The sweating surface, then, is also, physiologically speaking, below the level of the lesion, just as is the area in which sensation is lost. The different extent of corresponding areas is due to the fact that as regards the distribution of the peripheral fibres of the sympathetic system there is no segmental correspondence, whereas sensory and afferent fibres of the posterior roots of the central nervous system are segmentally arranged.

Since the excessive secretion of sweat is one of the trials to which paraplegics who show the mass-reflex are subjected, and since a continual moist condition of the skin greatly increases the liability to bedsores, it is a matter of great importance to find means by which this condition can be controlled. All stimuli which are capable of evoking the mass-reflex excite, with the other components, excessive sweating. The position of the paralysed limbs in bed may be a fruitful source of excitation and will be dealt with in the next section. Gastro-intestinal disturbances have been considered, as also have some aspects of vesical irritation. Rough handling of the genital parts during catheterisation, as when the glans is swabbed too roughly in cleansing or when the penis is grasped too firmly, is a productive source of stimulation. The catheter, too, should be passed gently, and in bladder lavage bland, non-irritating fluids (eusol 1 in 16,000) must be used. If these precautions are taken sweating will be less profuse during the daily bladder manipulation. But it will be found in many cases in which the spinal cord is very sensitive to stimulation that the act of reflex evacuation of the bladder may evoke excessive sweating. During lavage, after the bladder has voided its contents the first time, there may be no increase of the moisture of the skin, but when the reflex act has been evoked several times the patient usually pours with sweat. As a rule, however, it is unnecessary to wash out the bladder by evoking the reflex more than three times in succession.

Heightened intravesical tension, which causes stretching of the bladder musculature, may be the source of excitation of profuse sweating. When the spinal lesion is well above the lumbar enlargement, this cause of irritation is not, as a rule, prominent; for by the time the patient has begun to sweat below the level of the lesion the bladder is automatic, and it is only when there is abnormal spasm of the sphincter induced by cystitis that this complication arises. But when the lesion is situated near the lumbar enlargement the vesical reflex arcs recover their functional activity late, as a rule, so that retention of urine may co-exist with flexor spasms and excessive sweating. In such cases it is of extreme importance that the bladder should be emptied by catheter at regular intervals. Usually, if the catheter is passed every six hours during the period of retention the bladder will never be over-distended, but in many cases the bladder has a smaller capacity than normal, and it must be emptied at four- or five-hourly intervals.

As has been already said, the antiseptic fluid used in washing out the bladder must be as bland as possible. A strong solution of eusol, potassium permanganate, or any other antiseptic has a powerful irritating effect on the mucous membrane of the bladder, whereby its resistance is lowered against organismal infection. At the same time strong impulses, which the caustic fluid initiates, stream into the spinal cord, evoking excessive sweating, flexor spasms, and all the phenomena of powerful mass-reflex reactions.

To find out and to eliminate, as far as possible, the exciting causes of reflex sweating is the most important part

of the treatment of the condition. Drugs frequently have no effect in controlling a profuse sweating, but in some cases atropine will be found to be useful. So as not to dissipate its effect it is best to limit its administration to the evenings, in order to try to control the outpouring of sweat in the night, which so often disturbs the patient's rest. Liq. atropinæ, ♏ i.–ii., given in water about 8 or 9 P.M., will be helpful in many cases.

℞ (*d*) *Flexor spasms.*—The defenceless patient, lying anchored in bed, is at the mercy of the strong involuntary flexor movements of the lower limbs and trunk which convulse him periodically. So violent may these spasms be that he is pulled hither and thither, and may even be thrown out of bed. If the paralysed parts are active and the spasms uncontrolled he gets no peace and life is a misery to him. It is as if he was in the clutch of a powerful enemy who is unrelenting in his tortures. It becomes, then, imperative that the physician and nurse find out how the flexor spasms can be controlled.

These movements form part of the mass-reflex, and impulses arising from stimuli of nocuous nature from any part of the paralysed region of the body can evoke them. Tension on the muscles of the limbs, an over-distended bladder or cystitis, gastro-intestinal irritation, irritating bedsores are all capable of evoking vigorous involuntary flexor movements. The posture in which the lower limbs and trunk are least excitable must be ascertained in each individual case. It will be found, as a rule, when the patient lies on his side with the abdominal muscles relaxed and the lower limbs drawn up that he can get freedom from spasms for a considerable time. Provided that the skin of the buttocks is healthy, and the soft tissues over bony parts are relieved from pressure, it is often advisable to place the patient in this position for the night. Another posture which will be found to give relief is one in which he is propped up in bed in a semi-sitting position, with the legs somewhat flexed and supported under the knees by pillows. The feet are kept up by a foot-rest. A combined adjustable foot-rest and support for bedclothes was devised for use at the Empire Hospital, and has been found of great value.

Nurses who are unaccustomed to deal with patients of this class must be taught how to handle them, for they can do much to alleviate their sufferings by adopting proper methods in turning the patients and moving them about in bed. The paralysed parts have to be manipulated gently and without jerking movements. With a pulley rigged over the top of the bed the patient can do much to help himself, and he soon becomes very proficient in moving his body about.

Urinary sepsis, dyspepsia, and intestinal disturbances are accompanied by frequent violent flexor movements, and with successful treatment of these conditions the spasms diminish in frequency again. Inflammation of the prepuce and of the skin of the scrotum caused by uncleanliness or faulty adjustment of the urinal may be the focus from which impulses pour into the spinal cord. The external genitals should be carefully washed at least twice a day, and the urinal cleansed each time it is emptied. It is often advisable to place a pad of cotton-wool between the urine bottle and scrotum.

The cause of unusual flexor activity in the limbs is sometimes traced to irritating bedsores, especially if they involve the tissues near the feet, where the threshold is low. Sores situated over the sacrum or buttocks are much less potent, for in this region the threshold is high. Superficial healing bedsores and even abrasions of the skin covering the malleoli or the heel are just as irritating as are sloughing, septic wounds; if clean, an ointment containing benzoin or zinc will be found to be soothing, and will at the same time promote healing. If the wounds are septic and sloughing fomentations applied four-hourly till the sloughs have separated is the best treatment. Then, so long as the sore is discharging pus it may be cleansed with eusol, 1 in 6000 or 8000, or liq. sodæ chlorinatæ (B.P.) or liq. aluminii acetatis, 2 per cent., and dressed with gauze wrung out of the solution, morning and evening. When the wound is becoming clean and healthy red granulations are forming, a simple dry gauze dressing can be used. The formation of unhealthy pale granulations indicates that fomentations or antiseptic wet dressings should be stopped. The healing process can then be aided by the application of stimulating solutions, such as red lotion, friar's balsam, or liq. argenti nitratis, 1 or 2 per cent.

It is a mistake to give up large dirty bedsores as hopeless. They will heal in the majority of cases, though the healing process is slower than in normal tissues. If carelessly dealt with they will kill the patient as surely as will a septic urinary tract; and the one condition allows the other to flourish.

The nursing and general treatment of paraplegic patients who exhibit the mass-reflex can be summarised shortly. The spinal cord below the lesion is exquisitely sensitive to impulses originating from the most diverse stimuli. The reaction evoked involves the whole paralysed region, somatic and visceral, and is so uncontrolled and violent in character that it dominates the life of the unfortunate patient. Our endeavour should therefore be directed to allaying the excitability of the spinal cord by removing as many nocuous influences as possible. The limbs and the viscera, such as the bladder and intestinal tract, must be treated with the greatest gentleness, and every care must be taken to avoid the generation of long-continued and violent mass-reflexes.

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BLOOD PRESSURE AND PHYSICAL FITNESS OF THE SOLDIER.

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IT has been suggested to the writer that a brief note on some blood pressure observations, which have been in the melting-pot for some years, may be of value at the present time.

Description of Test.

Because of the absence, up to the present time, of a satisfactory explanation of the significance of the tonal changes evident in making a blood pressure observation by the auditory method most clinicians have been led to ignore them, and but few in this country have even observed them. The technique is perfectly simple, being well within the capacity of a nurse; and in spite of all that has been written to the contrary, the writer is quite convinced that the subjective factor is no greater than that which enters into the other, more usual, physical tests. Indeed, it is less than in many.

The phenomena observed and the descriptive terms applied are as follows:—

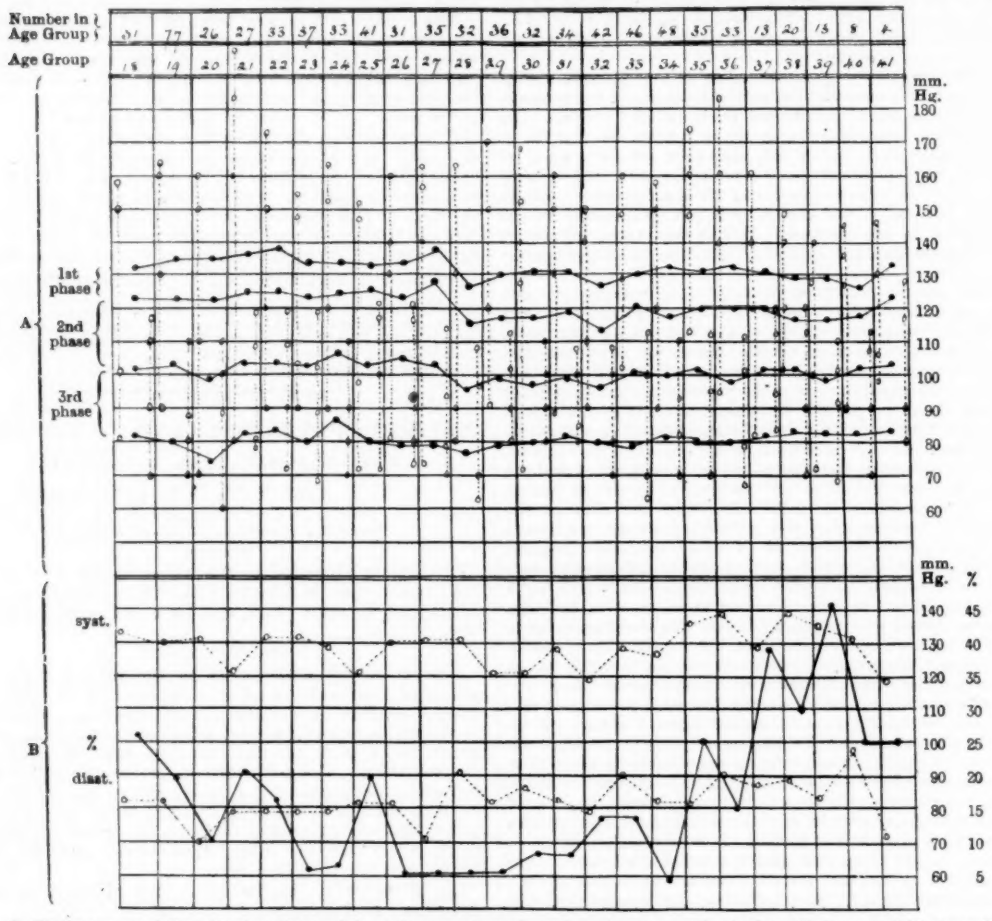
The brachial being compressed with the cuff and the chest-piece of the stethoscope applied over the artery at the lower border of the cuff in the usual way, it will be noted that as soon as the blood re-enters the artery a sharp tap is heard; this is quite generally recognised as indicating the systolic blood pressure. The first tap is followed by a succession of similar taps all in the same tone; this series of taps is regarded as being the *first*, or *first tonal, phase*. Normally this is followed by a series of short murmurs; these last for a variable period as the mercury column falls, and may encroach upon, or be encroached upon by, the preceding or succeeding phase. This murmur phase is usually termed the *second phase*. The *third phase* follows, this is also a tap or tonal phase; the taps follow the series of murmurs somewhat abruptly, and are clearer and more intense than those of the first tonal phase. At a certain point the sharp tap becomes suddenly and definitely muffled; this is the point most generally accepted as representing the diastolic pressure, and the whole series of muffled tones is termed the *fourth phase*. The point at which no sound is audible is the *fifth phase*.

Duration of each phase.—As will be seen later, the first should be 20 per cent. of the pulse pressure, the second 40 per cent., and the third 40 per cent. It may be well to recall that the term pulse pressure means the difference between the systolic and diastolic readings. A reading which showed 120 systolic and 80 diastolic would indicate a pulse pressure of 40, a first phase of about 8, a second phase of about 16, and a third phase of about 16 mm. Hg, and would read thus: 120, 112, 96, 80.

I now suggest that the presence and relative lengths of these phases is of wider clinical significance than the height

TABLE I.—*Giving an Analysis of 769 Blood Pressure Observations in a Group of Guardsmen during their Twelfth Week of Training.*

A, The upper part of the table indicates (dots and lines) the average pressure readings in each group *showing all phases*, and (circles and dashes) the highest and lowest reading in each group.



B, The lower part of the table gives (dots and lines) the percentage of men in each group *falling to show all phases*, and (circles and dashes) the average systolic and diastolic pressure of those making up this percentage.

of the systolic pressure alone, or even that of the systolic and diastolic readings compared. It is quite a common experience to find an obviously inefficient heart giving what is accepted as a normal systolic and diastolic blood pressure reading. Yet I have not seen a case such as this which showed all the phases in anything like the suggested normal proportion.

Results in Soldiers under Training.

Table I. is an analysis of the blood pressure findings in a group of 769 soldiers (Guardsmen) during the twelfth week of training. The standard set as suitable for the test was that each man selected should be "up to his squad"—that is, he had not fallen back in his training because of any physical disability. The men were examined in small groups at 4 P.M. daily. This time was selected as the object of the test so as to determine the fitness of the men at the close of the day's work and to compare their relative endurance at different ages. Observations were also recorded after exercise; and pulse and respiratory conditions were noted, but these are not considered in this note.

1. Comparison of the age-groups shows that there is but little variation in the average readings, all being much on the same level.
2. The average systolic pressure is higher than that which one finds in the conditions of civil life. It will be remembered that these tests were made at the end of a hard day's work.
3. That the average diastolic pressure is more constant, not showing the same tendency to rise as the systolic.
4. That the average pulse pressure is approximately 60 per cent. of the diastolic pressure.
5. That the average period of the first phase is 20 per cent. of the pulse pressure.
6. That the average period of each of the second and third phases is about 40 per cent. of the pulse pressure.
7. That with the singular exception of age 25, ages 23 to 31 showed the highest percentage of men in whom all phases were present.
8. The extremes of pressure in each group are notable, indicating the wide range within which individuals may vary, yet the average of each group is strikingly constant.

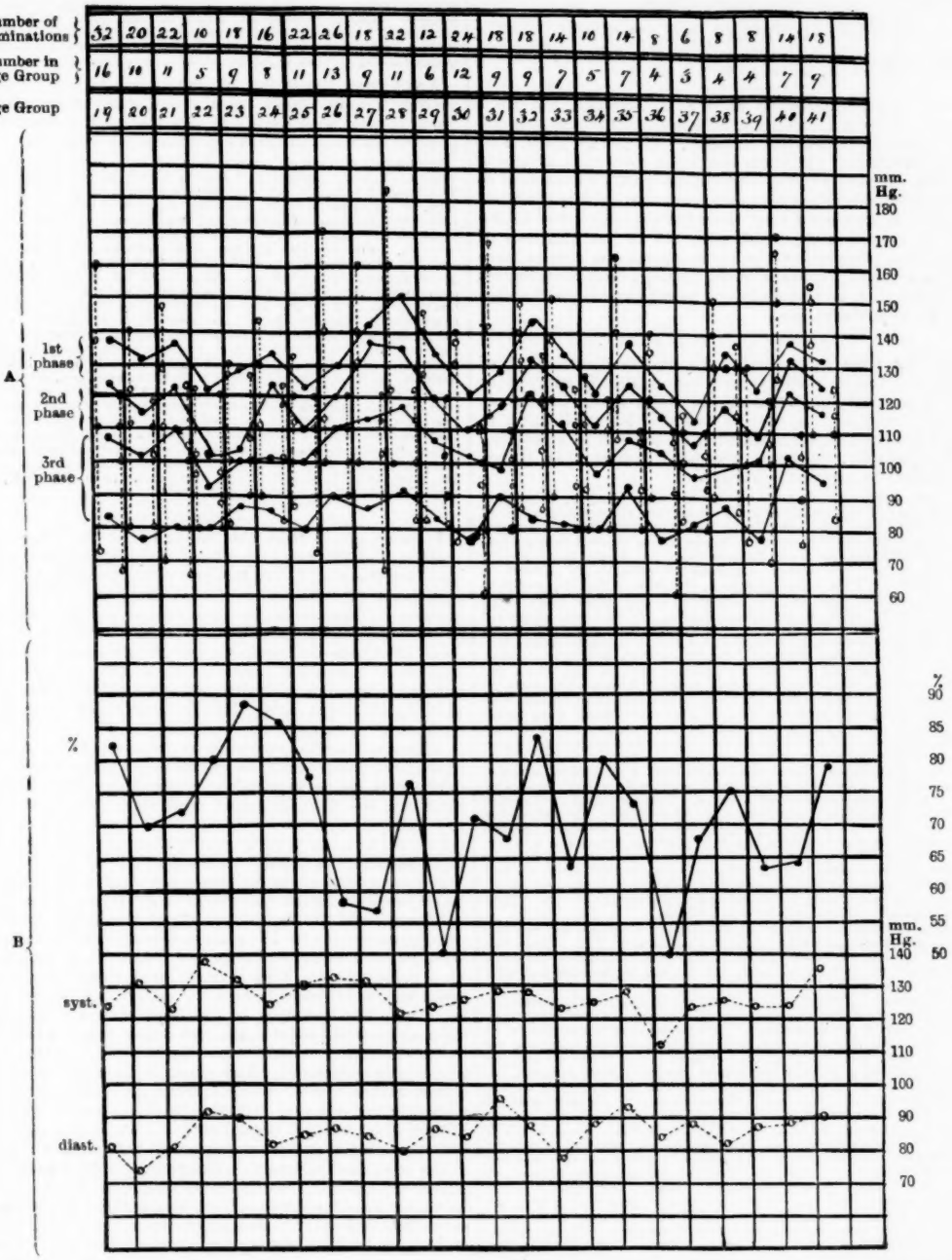
It may be stated here that a careful canvass of the drill instructors and company commanders showed, without exception, that their experience led them to expect more from the men between 21 and 31 than any age before or after. They all equally agreed that the men under 20 and over 35 required much more careful handling.

The conclusions suggested by these considerations are: That the most constant factor, the diastolic pressure, is for all ages somewhere between 70 and 90; that the systolic pressure should be about 50 or 60 per cent. higher than this; that the range of pressure between the two should be capable of differentiation into three different phases—the first, or first tonal, being 20 per cent. of the whole; the second, or murmur, phase 40 per cent.; and the third, or second tonal, 40 per cent. These findings are characteristic of the fit man.

Results in Invalided Men.

Table II. is the analysis of a group of 189 men, all of whom had been invalided home from abroad, but included none of organic heart trouble. Practically all showed, or had showed,

TABLE II.—*Giving a similar Analysis of a Group of 189 Men (not suffering from Organic Heart Trouble) Invalided Home from Abroad.*



evidence of autonomic disturbance of the cardio-vascular mechanism (D A. H.).

Certain features in the group stand out clearly. The very high percentage of the men who do not show all the phases and the greater instability of the diastolic pressure. That even those who showed all phases show quite a remarkable variation in the relative proportion of these as compared with the first group. It will be noted that the best groups in this table—namely, ages 29 and 36—compare most unfavourably with the worst groups of the first table—namely, ages 37 and 39. These readings were all taken from hospital records, and were made soon after admission and again shortly before disposal.

The conclusions are: (*a*) that the men who are less efficient than normal do not show the characteristic phases which prevail in the group analysed in Table I.; (*b*) that those who are physically fit show these phases in the majority of readings; (*c*) that the result of this simple test is a factor worth considering in estimating the physical capacity of an individual.

The practical application of this test, in addition to its simplicity, takes but little time; two minutes at most.

In selecting and examining the large number of fit men the writer is deeply indebted to Surgeon Lieutenant-Colonel P. H. Whiston, Irish Guards, for many facilities and much encouragement. He was also placed under an equal obligation to Lieutenant-Colonel W. H. Ingilby, Scots Guards, for without his sympathetic coöperation and active help it would have been impossible to carry out the tests.

THE COMPLEMENT-FIXATION TEST IN TUBERCULOSIS.

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THIS work was initiated by Major F. B. Bowman, C.O., No. 1 Canadian General Laboratory, Folkestone, of which unit the writer was formerly on the strength. Since the disbanding of that laboratory the work has been continued at Moore Barracks. It was at first undertaken partly in response to the request of clinicians who had made use of the test before, and partly in the hope that it might prove of value in the Army as a routine examination to aid in the diagnosis of tuberculosis. Regarding the latter object the results have not been brilliant, but some of the findings have nevertheless been interesting, and now after a year's experience it seems advisable to publish them.

Abstract of Literature.

From the time of the discovery of the phenomenon of complement deviation efforts have been made to apply it as a test in a variety of diseases, and while most success has been met with in the case of syphilis, its application in tuberculosis has claimed a considerable amount of attention. The bibliography, therefore, has been greater than it has been possible to cover at this time.

After the fundamental work of Bordet and Gengou, Besredka[1] devised a special egg medium upon which an abundant growth of tubercle bacilli was obtained, from which he prepared an antigen which gave positive deviation with the serum of tuberculous guinea-pigs. In collaboration with Manoukhine, he found that of 750 sera sent in for the serum diagnosis of syphilis 79 showed a positive fixation with this antigen. He also noted in conjunction with Netter that of 12 infants suffering from tuberculous meningitis none gave a positive fixation. Debains and Jupille[2] used his antigen in the examination of sera from about 600 cases. They noted that a number of sera of apparent normals fixed complement slightly in the presence of the antigen, and they decided to use a fixed dose of antigen and serum, and to vary the complement dilution. Sera with a strongly positive Wassermann reaction sometimes showed positive fixation with the tubercle antigen, and this was attributed to the lipoids which the latter contained. They found the reaction positive in almost all cases of tuberculosis except in very advanced pulmonary disease and in meningitis. In some cases positive reactions occurred when it was impossible to establish any objective sign of the disease, and these cases often gave a history of contact. Renaux[3] sought to overcome the cross fixation with syphilitic sera by extracting Besredka's antigen with ether. This appeared to decrease the number of positives with the luetic sera without decreasing the specific properties of the antigen. Inman[4] also used Besredka's antigen and concluded that a negative test indicated the absence of a tuberculous lesion or the arrest of a previously active one, while a positive reaction in serum diluted 1/32 indicated an active lesion. Calmette and Massol[5] used a special antigen obtained by extracting washed bacilli with 1 per cent. peptone at 65° C. and concentrating the filtrate. They got with this 92·5 per cent. positive in 134 cases.

Amongst the earliest workers on the subject Caulfeild and Beatty[6] published the results of an investigation in January, 1911. They used both O.T. and B.E. as antigen, and with the latter obtained 56 per cent. positive results in tuberculous cases, but did not regard the test as a diagnostic procedure.

Difficulties in the way of using complement fixation for diagnostic purposes in tuberculosis have been regarded by many as resulting from defective properties of the antigen. In a preliminary inquiry as to the value of the test, this point was particularly under investigation by Dudgeon, Meek, and Weir.[7] Some seven different types of antigen were tried, including various tuberculins, tissue extracts, sputum, &c. They finally decided in favour of a suspension of dead tubercle bacilli, which in 131 cases of pulmonary tuberculosis gave 84 per cent. positive results. Surgical tuberculosis yielded 57 per cent. positives. Later, Dudgeon,[8] referring to this work, stated that the bacillary antigen, while valuable for determining a positive reaction, was practically abandoned for his purposes in studying the reaction in inoculated animals. He used instead an alcoholic extract of bacilli. With this extract Dudgeon, Meek, and Weir[9] again published results on 234 bacteriologically positive cases and obtained 89·3 per cent. positive fixations, though 15 of these were negative on the first examination. In December, 1913, Elizabeth Fraser[10] published a concise preliminary study of the comparative value of different antigens, and favoured an emulsion of living bacilli from glycerine potato. She found 68 per cent. positive reactions in tuberculous sera. Again, McIntosh, Fildes, and Radcliffe,[11] used moist living bacilli in saline and in 43 pathologically certain cases of phthisis obtained 76·7 per cent. positive fixations, and in 26 surgical tuberculous conditions, excluding adenitis, obtained 80·7 per cent. positive. In another article on the subject Radcliffe,[12] who refers to the earlier work of Bordet and Gengou, Wassermann and Brück, Citron, Lüdke, Morgenroth and Rabinowitsch, Hammer, Bang and Anderson, and others, was led by his own work to favour also a fresh suspension of bacilli as antigen. His results showed about 90 per cent. of 568 cases of pulmonary tuberculosis to give a positive reaction.

The more recent work in the United States has shown some very favourable results. Bronfenbrenner[13] made a study of Besredka's antigen and concluded that the lipins should all be extracted, and though a certain number of clinically non-tuberculous cases react positively the reaction nevertheless appeared to be specific. Craig[14] and McCaskey[15] used an alcoholic extract of several strains of T.B. grown upon Vedder's starch medium. Miller[16] and Zinsser prepared their antigen by grinding 20 mg. of moist T.B. mass with 90 mg. of dry salt in a sterile tube, and then adding 10 c.cm. of distilled water to make an isotonic suspension. Heating to 60° C. for half an hour appeared to have no deteriorating effect. Miller[17] published very good results with this antigen. Burns, Slack, Castleman, and Bailey[18] used Miller's antigen. Corper[19] used an autolysate antigen. Bronfenbrenner obtained 98·3 per cent. positive reactions in active tuberculosis, Craig 96·6 per cent., Miller 96·8 per cent. to 93 per cent., so that in this class of case the three types of antigen showed very little difference.

Apart from the matter of obtaining a high percentage of positive tests in known tuberculosis, there is the problem of cross-fixation with syphilitic sera and of the occurrence of positive reactions in cases not clinically tuberculous.

Inman found 24 per cent. positive in 100 cases sick in hospital from other conditions. Debains and Jupille found 24 per cent. of positive Wassermann sera, 17·3 per cent. of sera from non-luetics, and 3·2 per cent. of apparent normals showing positive fixations when using Besredka's antigen. With the same, Bronfenbrenner found 24 per cent. positives in treated and untreated syphilis, and 8 per cent. of other controls. With his own antigen, Miller obtained only 4·4 per cent. positives in serologically positive luetics, and 22·8 per cent. positives in doubtful cases of tuberculosis. Craig found 5·4 per cent. of 350 Wassermann positive syphilitics reacting with his tubercle antigen, while of 200 healthy soldiers only one case was positive and later developed clinical tuberculosis. Radcliffe found no positives in 45 normals examined 204 times, and none also in 9 cases confirmed at autopsy as having no tuberculosis. McIntosh, Fildes, and Radcliffe had negative Tbc. fixations in all of 18 syphilitics, and 3 positive in 87 other diseases and normals. Burns, Slack, and others, with Miller's antigen, obtained 15 per cent. positive Tbc. fixations in 221 positive Wassermann sera and 13 per cent. in 691 negative Wassermann sera. They do not consider this too high a percentage in view of the widespread character of the tubercle infection and the class of patients from which their material came. (In the total sera examined they note 37 delayed negatives.) McCaskey, with Craig's form of antigen, obtained 44 per cent. positive Tbc. fixations in 25 positive Wassermann sera. In all except 8 per cent. clinical evidence was against tuberculosis.

Technique.

It is apparent from this résumé that the occurrence of positive fixation tests in known tuberculosis is high, and that, on the whole, the antigen most favoured has been a suspension of living bacilli. It seems probable that such antigens if they have not been heated and have stood with or without preservative become sooner or later equivalent to an autolysate antigen. Corper and Sweany[20] have shown that little difference occurs between the results with the autolysate antigen and with Miller's bacillary antigen when used on the same sera. Miller regards polyvalency in the antigen to be important.

After some preliminary work on the comparison of antigens made from dried bacilli and from moist living bacilli, it was decided to use a suspension of the latter made somewhat after the manner suggested by Miller. The antigen used has been a polyvalent one—at first from four strains, and later from ten; four were obtained from Dr. Stanley Griffiths and the others isolated from sputum in our own laboratory. The proportions given by Miller were taken as a standard, but it has been found convenient to weigh out some multiple of 20 mg., add the requisite multiple of dry salt, grind in an open glass mortar for 15 or 20 minutes, make up to 10 c.cm. with distilled water, and then add 0·5 per cent. carbolic acid as a preservative. This gives a stock suspension in hypertonic saline of known strength which can be diluted as required. The grinding in the open mortar allows a very even suspension to be made, the water being added a few drops at a time so that the powder is worked up into a paste and finally suspended. The stock antigen can be stored in a tube with a rubber stopper and shaken thoroughly before each dilution is made. Heating to 60° C. before adding the preservative has not been found to make any appreciable difference in the antigenic properties, but for the most part it has been used unheated. The storage in hypertonic saline appeared to have no markedly unfavourable effect, though a four-months-old antigen of ten times the standard seemed very slightly weaker than a three-day-old suspension. Stock antigens older than six weeks, however, have not been used in the tests. On the whole, after the first few days they have been found to remain comparatively uniform for more than six weeks. The anti-sheep-cell system has been used throughout with amboceptor supplied from Burroughs, Wellcome, and Co. Complement has been obtained, as a rule, from three or more guinea-pigs. This point seems to be of some importance, for differences in action towards the same antigen have been found in comparative titrations of the sera of individual animals. Radcliffe also noted differences in his work.

The patient's serum has been inactivated at 55° C. for 15 minutes in some cases, in others for 30 minutes. This point did not seem to be of great importance, and most of the sera had the longer inactivation. It is important, however, that the sera be fresh, for there seems to be a

distinct tendency for some sera, stored several days in the ice-chest, to develop substances of such quality and quantity as to produce a positive reaction without being detected as anticomplementary bodies in the serum control. Such reactions are undoubtedly false.

The actual test made at first was similar to that described by Kolmer[21] for the Wassermann reaction as Method I., except that one-quarter the amounts of the hæmolytic system were used. The patient's serum was tested in 0·05 c.cm. and 0·1 c.cm. amounts, with a serum control of each quantity, making a four-tube test in all. An antigen dilution containing the quantities given by Miller was used, its anticomplementary value obtained, and at most one-third of this used in the test. Titration of the amboceptor was always made for each day's tests in the usual manner and the cells employed were sensitised with two units of amboceptor. In the following paragraphs this method will be referred to as Method I.

Later, and for the greater part of the work, another method was employed, similar to that described as Method IV. for the Wassermann test recommended in the report of the Special Committee upon the Standardisation of Pathological Methods of the Medical Research Committee. Three slight modifications were introduced; first, the use of 2 m.h.d. of complement in the serum control instead of 3 m.h.d. as being more accurate for detecting anticomplementary substances; second, the use of 0·1 c.cm. of patient's serum in the place of 0·25 c.cm. of a 1 in 5 dilution—i.e., just twice the quantity of actual serum; third, the use of a 2·5 per cent. suspension of sheep cells instead of 3 per cent. In this method, hereafter referred to as Method IV., the m.h.d. of complement is first determined by titration with cells sensitised with 5 m.h.d. of amboceptor. 0·1 c.cm. of serum to be tested is placed in each of three tubes; in the first is placed 3 m.h.d. of complement, in the second, 5 m.h.d., and in the third (serum control) 2 m.h.d. The dose of antigen which is placed in the first and second tubes binds by itself not more than 1 m.h.d. of complement as determined by titration before each day's tests. The 5 m.h.d. cells are used throughout. The total volume in each tube is 1 c.cm. Both in the titrations and in the actual tests incubation takes place for 1/2 hour at room temperature and 1/2 hour at 37°C. before the addition of cells.

In the case of Method I. readings were taken at the end of 15 minutes and 30 minutes of the final incubation, as some observers have stated that small amounts of fixation must be considered. The 30 minutes was concluded to be best. Provided the controls were clear, complete inhibition in both the 0·05 and 0·1 tubes was called +++; partial inhibition in the 0·05 tube and complete in the 0·1 tube was called ++; slight or no inhibition with 0·05 c.cm. of serum, but complete or almost complete with 0·1 c.cm. of serum, was called +. In the case of Method IV. complete inhibition in both 3.m.h.d. and 5 m.h.d. tubes is called +++; complete inhibition in the 3 m.h.d. tube and partial in the 5 m.h.d. tube ++; complete inhibition in the 3 m.h.d. with slight or none in the 5 m.h.d. tube +. The serum control must of course show complete hæmolysis. Lesser degrees of inhibition in the 3 m.h.d. tube can be indicated by ± and ±.

The work began with the testing by Method I. of sera from known cases of tuberculosis and of sera sent in for the Wassermann test. In over a consecutive 100 of the latter this method yielded 21·6 per cent. positives. While I was only able to obtain further history in about one-third of the positive cases, none of these gave definite clinical evidence of active tuberculosis. This percentage was rather higher than expected at that time, and it was concluded that Method I. was perhaps too sensitive, although in sera from active tuberculosis it gave only about 80 per cent. positive results. Method IV., in comparison, showed in the same routine sera only 6·8 per cent., with a trace or more of Tbc. fixation, so that this fact rather favoured the choice of this method for further work. Certain other features recommended the adoption of Method IV. First, it was preferred as being more nearly a quantitative test, since the number of plus signs used in the readings corresponded rather closely to the number of units of complement specifically fixed. Secondly, the use of cells sensitised with five units of amboceptor appeared to be the most practical way to overcome the difficulty arising from natural sheep amboceptor in human serum, for at this high dosage the reciprocal relations between complement and amboceptor are unaffected. This has been indicated in the work of Kaup and Kretschmer.[22] Thirdly, this method for making the fixation tests for tuberculosis was more convenient owing to the adoption about this time of a similar method of performing the Wassermann test, because the same complement titration was applicable to both. In the fourth place, if it were found necessary, it would be a very simple matter to increase the sensitiveness of the test by reducing the amount of complement allowed for specific fixation.

As bearing on this last point it is surprising how much complement can sometimes be bound by tuberculous sera in the presence of the tubercle suspension. On one occasion, in 2 out of 6 strongly positive sera (0·1 c.cm. amounts), over 10 m.h.d. of complement were fixed. True, these are exceptional, but they are a good indication of the specificity of the reaction, and suggested at the time that to allow for the specific binding of 1 m.h.d. of complement (i.e., 1 unit over and above the total amount which is absorbed by the serum and antigen alone) would make the test sufficiently sensitive for practical purposes. Method IV. therefore was adopted for the greater part of the work.

Results.

The results here recorded are based on a total of 570 different cases. A great many more tests than this have of course been carried out, for sera have been repeated and comparisons made between the two methods of performing the test. Comparisons have also been made between antigens, between different quantities of the same antigen, between different quantities of the same serum, to determine the suitable amount for testing, and so forth, the outcome of which has been the employment of Method IV.

The accompanying table presents the more important part of the results in brief form.

Table of Results.

Description of cases.	Method used.	No. of cases.	Classification of cases.	Readings.				
				Neg	±	+	++	+++
110 Tbc. cases all path'y or clin'y certain.	I.	15	Unclassified.	2	0	4	2	7
		24	Quies't, pul.	19	0	3	2	0
		71	Active, pul'y.	16	0	15	16	24
134 routine sera for Wass. Tbc. not susp'd. 9 of the pos. clin'y negative.	I.	134	Unclassified.	105	0	22	6	1
Comparison Meth. I. & IV.; routine sera; same specimen in all cases.	I.	110	Unclassified.	88	0	19	2	1
	IV.	110	"	103	1	4	2	0
Comparison Meth. I. and IV.; Tbc. sera; same specimen in all cases.	I.	56	Active, pul'y.	13	0	11	13	19
	IV.	56	" "	13	7	11	8	17
176 Tbc. cases, all pulmonary, all classified. From Can. Spec. Hosp., Lenham.	I.	17	Active, incip.	4	0	4	3	6
		39	" mod. ad.	10	0	8	10	11
		15	" advan'd.	2	0	3	3	7
		10	Quies't, incip.	9	0	1	0	0
		13	" mod. ad.	12	0	1	0	0
		1	" advan'd.	0	0	1	0	0
		71	Total, active.	16	0	15	16	24
		24	" quies't.	19	0	3	2	0
		27	" incip.	11	0	5	5	6
		52	" mod. ad.	22	0	9	10	11
		16	" advan'd.	2	0	4	3	7
	IV.	17	Active, incip.	4	2	3	2	6
		73	" mod. ad.	17	2	15	12	27
		31	" advan'd.	3	3	3	7	15
		15	Quies't, incip.	11	1	1	2	0
		24	" mod. ad.	17	1	1	3	2
		1	" advan'd.	0	1	0	0	0
		121	Total, active.	24	7	21	21	48
		40	" quies't.	28	3	2	5	2
		32	" incip.	15	3	4	4	6
		97	" mod. ad.	34	3	16	15	29
		32	" advan'd.	3	4	3	7	15
8 cases unclassified tuberculosis.	IV.	8	Unclassified.	5	0	1	1	1
216 cases, mostly G.U. history in all, clinically negative for Tbc.	IV.	215	"	154	14	26	17	4
22 cases in doubt or final board "Tbc. susp."	I.	5	—	4	0	1	0	0
	IV.	17	—	11	0	5	0	1
41 pos. Wass. sera, no Tbc.	I.	23	—	13	0	7	3	0
	IV.	32	—	23	2	4	1	0
96 cases not clin. Tbc., spec. note re contact.	IV.	84	No contact.	67	2	7	7	1
	IV.	12	Definite contact	3	4	3	2	0

199 cases tuberculosis, all kinds, showed 16 positive Wass. tests.

Discussion and Conclusions.

1. *The diagnostic value of the test.*—The percentage of positive reactions in active pulmonary tuberculosis—77 per cent. (Method I.), 74 per cent. (Method IV.)—is not as high as that published by the American workers, but approximates the earlier results of Dudgeon, Meek, and Weir, and of McIntosh, Fildes, and Radcliffe. If the ± reactions of

Method IV. are included the percentage by this method rises to 80. Certainly this method could be made much more sensitive and to give a higher proportion of positives, but from the figures in the cases not clinically tuberculous it appears probable that the test would then be robbed of its practicality. In fact, even with these present results the practical value is in considerable doubt. Captain G. S. Gordon, O.i/c G.U. surgery at this hospital, to whom I am indebted for the histories in the majority of the cases not clinically tuberculous, found the test of no definite assistance, chiefly because in genito-urinary disease if the Tbc. fixation be positive it does not localise the lesion in the genito-urinary tract, and usually in active tuberculosis the disease can be diagnosed by other methods. On the other hand, it has been reported by Captain Farquharson, O. i/c Laboratory, 15 C.G.H., that the test has in some cases been an aid to the clinician in reaching a diagnosis.

The best results published have been those of Miller and of Craig. They obtained the highest percentage of positives in the known tuberculous (about 93 per cent.), with the lowest percentage in the non-tuberculous (between 4 and 5 per cent.), although each used a different antigen. From the experience of others one cannot help thinking that these two observers have been particularly fortunate in the class of their cases. McCaskey, with Craig's antigen, and Burns, Slack, and others, with Miller's antigen, have not had such striking results. In this present work the effort has been, not to make the test more sensitive, but, if anything, less so, in order that a strong reaction may be a reliable fact with a definite significance to the clinician. It is disappointing when a case is clinically tuberculous and gives a negative test; but if one tries to push it to the 100 per cent. limit, then the test seems to lose the slight value it may have in the doubtful cases. Method IV. is conservative, and in spite of two or three cases met with, it would appear that the +++ reaction can be relied upon under the proper conditions as a definite aid in diagnosis, but the number of cases in which it will clinch a diagnosis that could not be made by other methods will be few In view of this and the widespread character of the infection, therefore, one is led to agree with McIntosh, Fildes, and Radcliffe, that "however perfected, it can never attain to the great practical value of the Wassermann reaction."

2. *The significance of a strong reaction.*—The strong reactions, +++ of Method IV., occurred most frequently, as would be expected, in active tuberculosis, 35 per cent. in incipients, 37 per cent. in the moderately advanced, 48 per cent. in the advanced. The last figures are higher than one would be led to expect from the work of some, but differences may depend upon whether the cases were gaining, holding, or losing, a classification which was not made in this list. This +++ reading indicates that 0·1 c.cm. of the patient's serum binds specifically three or more free units of complement. The large amount which can sometimes be fixed has already been noted. Comparisons cannot be made with others on this point, except that fixation was obtained by Inman in some sera diluted up to 1/256, and by Dudgeon, Meek, and Weir up to 1/1000 in a few cases. Meek [23] adopted as a standard of a strong reaction fixation in a serum diluted 1/10. On this basis he found the highest proportion of strong reactions (65 in 102 = 63·7 per cent.) in cases with the physical signs of extensive pulmonary disease—copious sputum, impaired general health, and apparently bad prognosis. Caulfeild [24] also made the observation that the patients whose sera maintain the complement-fixation result seem to go rapidly backwards. This reading therefore would seem to have some value in prognosis, though it also seems to be generally accepted that very far advanced cases are very often negative. Meyer,[25] in noting this, divides the third stage cases into late and early. The diagnostic value of the +++ reaction has been referred to. If it should occur in a clinically doubtful case it would appear to be fairly reliable, for it has been noted in only 1·8 per cent. of the clinically non-tuberculous.

3. *The significance of a negative reaction.*—This result means more to those who use a more sensitive method of testing, perhaps; but in this present work it appeared to be of no importance except in the very advanced stages. While the positive reaction occurs most frequently in active disease, it does not serve as an absolute indication of it, a view in agreement with the conclusions of Corper and Sweany. Neither is a negative reaction a certain sign of absence of activity. In this test we may be dealing with a peculiarity of the individual rather than a type of case. If the serological reaction of every patient to the same quantity of tubercle toxin were equal, then the amount of complement deviation would be a precise measure of the balance between the walling-off process and the absorption of toxin. This supposition is untenable in a mathematical sense, and seems unlikely even in a general way, judging from animal experiments. The irregularity of serological response to humanisation of individual animals is well known, and Dudgeon makes a note of it, in particular with rabbits inoculated with tubercle bacilli under exactly similar conditions. The interesting idea expressed by Miller concerning arrested, sputum-positive cases, with a negative fixation test, that they are really not suffering from the tuberculous condition, but are simple carriers, may be giving too much significance to a negative reaction.

4. *The significance of the test in the clinically non-tuberculous.*—Of the 215 cases coming under this class, the fixation test was positive in 21·8 per cent., or in 28·3 per cent. if the ± result be included. These figures are not unworthy of comment. They appear high as compared with those published by others from civilian patients. They may be taken to suggest that the wear and tear of war has reawakened dormant lesions sufficiently to produce antibody without sign or symptom, or that the more intimate contact of the soldier's life has seeded down more individuals than in peace times. This question must be left to others to discuss, but as bearing out the suggestion the following may be noted. In the Medical Supplement for August 1st, 1918, a reference is made to several writers having stated that tuberculosis has increased in the German Army considerably during the war. Ronzoni [26] is quoted as stating that 75 per cent. of soldiers (Italian) are infected with tuberculosis, judging by the cutaneous reaction, and that 20 per cent. have clinically active lesions. Brugnatelli [27] found tuberculous changes in 72 out of 304 autopsies (23 6 per cent.). Judging from the latter figures, therefore, the results in our 215 soldiers are not so much out of the way. That contact is of importance in the fixation test is noted in the special group of 96 cases, and family history, without definite contact being established, seems to have no significance. The percentage of those with history of contact which show positive reactions is as high as 75 if the ± readings are included.

5. *Non-specific fixation.*—Most of those who have worked with the test recognise that the reaction is definitely specific in the majority of cases, but that the probability of cross fixation exists in strongly positive syphilitic sera. This probability is also indicated in the results here published, even though a bacillary suspension was used as antigen. Of the 23 sera showing a positive Wassermann and tested by Method I., 43 5 per cent. showed Tbc. fixation, which is practically the same as the findings of McCaskey, who used Craig's antigen. Method IV., however, appears to reduce the percentage, as only 21·8 per cent. showed a trace or more of Tbc. fixation in the 32 syphilitic sera tested by this method. One interesting case seemed to have a direct bearing on the subject. The man had a bronchitis and was a Tbc. suspect with syphilis; at the first examination both the Wassermann and the Tbc. fixation tests were +++. His serum was sent in again several weeks later after finishing his course of antisyphilitic treatment because of a persistence of some suspicious features and his bronchitis. The reactions on this occasion were both negative, and later, on clinical grounds, he was concluded to be non-tuberculous. A Wassermann test has been made on every case here reported, and it still seems advisable that no interpretation of a Tbc. fixation test should be made without knowing this other test as well. There has been a suggestion of some non-specific fixation in cases of nephritis, but the number has been too small to warrant a definite statement.

6. *Positive Wassermann reactions in the tuberculous.*—Incidentally it has been shown that 8 per cent. of cases of tuberculosis have a positive Wassermann reaction. Von Adelung,[28] in California, found 8·7 per cent. of 195 bacteriologically proven cases of Tbc. to give this, while in Illinois, Corper and Sweany found it in 7·1 per cent. of 1290 sanatorium patients. Taken as an indication of syphilis, it seems worth noting, therefore, that the proportion amongst our tuberculous soldiers is practically not greater than occurs in the civilian population.

Acknowledgments.

As has been mentioned, this work was begun at No. 1 Canadian General Laboratory, then under the command of Major F. B. Bowman, in collaboration with whom some of the preliminary experiments were made. It was continued under the régime of Captain F. Adams at the same place, and later carried on at Moore Barracks after the disbandment of the laboratory in Folkestone.

I am especially indebted to Major F. H. Pratten, of the Canadian Special Hospital, Lenham, for sympathetic assistance in the arrangements for collecting material, and in the classification of the tuberculous cases. My thanks are also due to Captain H. R. McIntyre and Captain A. McKay, of this hospital and to Captain C. D. Farquharson and Captain D. H. Paterson, of No. 15 Canadian General Hospital, and to Captain G. H. J. Pearson, of the Canadian Special Hospital, Etching Hill, who all furnished me with histories of cases. I have already mentioned my indebtedness to Captain G. S. Gordon for many histories.

The privilege afforded by the Royal Society of Medicine to make use of their library has been greatly appreciated.

I desire to record the faithful work carried on by Sergeant E. D. Brown, Corporal F. E. Townsend, and Corporal M. J. Coomer during the whole course of this study, both at No. 1 Canadian General Laboratory, and afterwards at Moore Barracks.

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Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

ACUTE POLIOMYELITIS IN AN INFANT 12 DAYS OLD, WITH EXTENSIVE PARALYSES AND RECOVERY.

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THERE seems to be no case on record of acute poliomyelitis (infantile paralysis) with characteristic signs and symptoms in so young an infant. Cases of intra-uterine poliomyelitis have been spoken of, but without pathological and only little clinical evidence. There is every possibility that some deaths of the new-born with convulsions may be due to the virus of acute poliomyelitis, but the proof is yet to come. In the Monograph of the Rockefeller Institute for Medical Research (June 24th, 1912) reference is made by Peabody, Draper, and Dochez to a case two weeks old as the youngest recorded in the New York epidemics up to the time. The notes given below describe a typical text-book case as to mode of onset, pathological findings (except for the leucopenia), and after-results.

Notes of the Case.

The patient (Edward C——) was born on Sept. 1st at full term; normal labour of three hours' duration; no cyanosis at birth. He was the eleventh child; three miscarriages in early part of married life; one child died when 14 days old; other children and parents healthy.

The infant was admitted on Sept. 18th with complaint that the mother on the 13th, while washing him, noticed all limbs "limp"; he had not been crying since the 14th; last quite well on the 12th. No gastro-intestinal complaint; "takes very well"; fed on Nestlé's milk.

On admission baby was well nourished. There was slight cyanosis; breathing shallow. The neck and muscles of trunk were quite flaccid; facial muscles unaffected; no strabismus. Attempts at crying were unsuccessful. All limbs were quite flaccid except for voluntary movements of right hand and fingers; abdominal muscles and intercostals paralysed, *diaphragm alone working.* Knee-jerks not obtained. Sensations apparently not affected.

Five days after admission movements of the right forearm, left hand, and fingers were noticed; on the sixth day successful but feeble cry and movements of the left toes. Steady and gradual recovery of movements of the extremities and neck continued, the only permanent paralyses left at the end of ten weeks being those of the anterior group of muscles of the right leg, those of the left upper arm (except the biceps), and intercostals and abdominal muscles with their respective deformities of right foot-drop, flexion of left elbow, and an elongated, funnel-shaped chest with wasted muscles, and a flaccid protuberant abdomen. Electrical reactions were not made. No rise of temperature was recorded all the time. Patient was discharged on Dec. 5th.

Pathological findings.—I am much indebted to Dr. E. A. Ross for these investigations:—

Sept. 19th: Lumbar puncture fluid, 100 cells per c.mm., 91 per cent lymphocytes, 9 per cent. polymorphs, sugar present, globulin increased, cultures sterile.
Sept. 19th: White cell count, 4600 per c.mm.
Sept. 24th. White cell count, 5000 per c.mm.
Sept. 27th: Lumbar puncture fluid, 40 cells per c.mm., 99 per cent lymphocytes, 1 per cent. polymorphs, sugar present, globulin increased, cultures sterile.
Oct. 9th: Wassermann reaction on the mother, negative result.
No tubercle bacilli were found in the cerebro-spinal fluid.

As to treatment, urotropine in 2-gr. doses by the mouth and small doses of atropine and strychnine subcutaneously were given during the earlier weeks.

This case was kindly seen by Dr. Farquhar Buzzard in consultation, who agreed with our diagnosis. I must thank Dr. Clive Riviere, under whom the patient was admitted, for allowing me to publish the case.

PRIMARY NOCARDIASIS OF THE LACRYMAL GLAND.

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AND
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THE following is a note of a case of primary nocardiasis of the lacrymal gland, caused by a species of nocardia hitherto undescribed. The lacrymal gland appears to be one of the most remarkable glands in the body. Having few disorders of its own, it fulfils its destiny undisturbed by the disorders of the outside world, content to be left alone to administer its secretion to the great master-tissue the eye. The disease here recorded represents nocardiasis or actinomycosis, in which the causal agent is a germ or fungus, which grows readily aerobically and produces arthrospores.

The patient, a male aged 22, was admitted to hospital suffering from a swelling of the right eye, and inability to open it. The duration of the case was three and a half years. There was neither scar nor wound visible. The eyelids could not be everted, but when raised a thick yellow discharge poured out, and the whole conjunctival surface of the upper lid appeared to be rough and granular, with deeper ulceration in parts. The swelling was painless, and was of doughy consistency, though without œdema. There was a bulging forwards of the fornix of the conjunctiva. No lymphatic glands were enlarged, and the sight was unaffected. The eyeball itself was not invaded, nor were its movements involved, neither was photophobia or lacrymation present.

Under chloroform, the growth was dissected away; it appeared to have commenced in the lacrymal gland, and to have spread into the upper lid, invading the tarsal cartilage. It extended also somewhat between the eyeball and the bony orbit, along the ducts of the lacrymal gland.

Sections showed the morbid histology commonly associated with a fungal infection. A portion of a grain flattened between a slide and cover-glass showed that it was composed of the typical nocardial bacilliform hyphæ, with rounded bodies or spores, the whole being held together in a dense matrix. The reactions in various culture-media were investigated. The animal experimentation has not been concluded, but the condition does not seem to be pathogenic to the grey monkey.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

A MEETING of this section was held on Dec. 5th, Mr. J. D. MALCOLM, the President, being in the chair.

Foreign Body in the Gravid Uterus.

Dr. G. DRUMMOND ROBINSON showed a Skiagram of a Foreign Body in the Gravid Uterus. The patient, an unmarried woman, was admitted to hospital with a history that, thinking she was pregnant, she had tried to pass a crochet needle, the hook end of which was covered by a metal cap, into her uterus per vaginam. On withdrawing the crochet needle she was alarmed to find that the cap had not come away with it. She had hæmorrhage from the vagina, and on becoming frightened came to the hospital. The uterus was found to be bulky and the os was slightly patulous; no part of the metal needle-cap could be felt. The metal cap was clearly seen in several X ray photographs. Shortly after the skiagrams were taken the patient passed an ovum of about two months, together with the metal cap, spontaneously during an action of the bowels. The metal cap measured 2 1/10 in. in length.

A Uterus in which Changes had taken place as the Result of Procidentia.

Dr. DRUMMOND ROBINSON also read a paper on the above subject. The patient, aged 46, had complete procidentia of the uterus in 1900 (18 years ago) after the birth of her second child. In 1901 (17 years ago) hysteropexy was performed. In 1902 (16 years ago) the patient was confined of her third child. Shortly after this confinement the prolapse reappeared. In 1903 (15 years ago) Dr. Robinson first saw her. The vagina was completely prolapsed; the sound passed 8 inches; the supravaginal portion of the cervix could be felt through the vaginal walls, much elongated and very thin; the fundus uteri appeared to be attached to the anterior abdominal wall. An extensive perineal operation was performed, which enabled the patient to retain a pessary. Within a year the uterine canal had become so shortened that the sound only passed 3½ inches. There had been no further pregnancy. Lately the patient had had hæmorrhage from the vagina, and a year ago Dr. Robinson removed the uterus by Wertheim's method for carcinoma of the cervix. The fundus uteri was found firmly attached to the anterior abdominal wall. Immediately after the operation the sound passed through the external os 4½ inches into the uterus. The body of the uterus appeared to be enlarged. The patient made an uneventful recovery. The specimen was shown. Whatever the nature of the elongation of the supravaginal cervix in cases of procidentia might be (whether stretching of that structure alone, or new growth of its tissues, or both), this case proved that it might disappear to the extent of 4½ inches after the uterus had been replaced, even when the procidentia had lasted for as long as three years. He thought that such elongations might be, and probably at first always were, entirely due to mechanical stretching of the cervical tissues. Ventrofixation without support of the vagina by some means from below was insufficient for the relief of a really bad case of prolapse.

Dr. A. LAPTHORN SMITH said that at first he used to leave about 2½ inches of cervix, but found there was always some involution. He now left 3½ inches and found that the cervix later became 2½ inches.

Dr. HERBERT WILLIAMSON said that elongation of the supravaginal cervix might frequently be due to stretching, but in later stages structural changes might produce permanent elongation.

Dr. AMAND ROUTH agreed that stretching might occur at first, but if the cervix was allowed to remain down it became thickened and permanently elongated.

Dr. W. S. A. GRIFFITH asked what held up the body of the uterus and yet allowed the cervix to stretch like this.

Lady BARRETT gave an account of a case of a much elongated cervix, certainly due to stretching.

Labour in a Paraplegic Woman.

Dr. DRUMMOND ROBINSON gave an account of a case of labour in a paraplegic woman. The patient, aged 31 years, who had had seven children, was admitted to hospital in August, 1909, suffering from paraplegia of recent origin, probably due to transverse myelitis in the dorsal region of the cord. In October she was found to be three months pregnant and was transferred to the obstetric ward. During the time which preceded her confinement she suffered from bedsores, many rises of temperature, two attacks of congestion of the lungs, and offensive urine. The gravid uterus increased in size abnormally slowly after the fifth month and at full term was only as large as an ordinary seven months uterus. Labour took place 281 days from the cessation of the last menstrual period, and was painless, but otherwise entirely normal. Involution and lactation were normal. In 1897 Dr. Amand Routh read a paper before the Obstetrical Society of London in which he gave notes of seven similar cases, together with notes of a case of his own. Since then there had been no other similar case recorded. The fact that parturition and lactation occurred normally in these cases and in animals in which the lumbar part of the spinal cord had been removed suggested that these functions were carried on without the aid of the higher nerve centres, and the physiological stimulus to both these functions appeared to be the result of some chemical substance or substances, probably produced in some part of the reproductive system and conveyed direct to the uterine muscle and mammary gland by the blood stream. The most recent experimental research confirmed this view.

Dr. AMAND ROUTH said that in his case post-mortem examination showed that there was no communication in the spinal cord above the third and below the sixth dorsal vertebræ. At the confinement there was no proper intermission between the pains, which suggested that some control was missing. He thought that the explanation was that onset of labour was almost certainly due to biochemical action, the chemical substance starting the process probably being derived from the junction of the maternal and fœtal circulations, and acting on the lumbar plexus rather than directly on the uterus. Experiments showed that if the lumbar plexus were separated from the pregnant uterus the uterus was left very inert, whereas stimulation of the lumbar enlargement caused the uterus to expel its contents very violently. At the time of his observations lactation was supposed to be the result of nervous influence due to the uterus being empty, but in this case it must have been due to a chemical substance.

Dr. LAPTHORN SMITH drew attention to the fact that painless labour had occurred under spinal anæsthesia.

Dr. DRUMMOND ROBINSON said that he had performed Cæsarean section on a patient under spinal anæsthesia. The operation was perfectly painless and the uterus acted strongly. Experiments had been carried out by Professor Starling and Dr. Janet Lane-Claypon on virgin rabbits, changes such as occur in nature as the result of pregnancy being produced as the result of injection with various parts of a fœtus. It was thus evident that there was something in the fœtus which was capable of stimulating the mammary gland.

Puerperal Anuria.

Mr. CLIFFORD WHITE showed microscopic sections and small portions of kidney removed during nephrotomy on two patients suffering from puerperal anuria. In both the partial suppression of urine had lasted about ten days, and in both cases immediate recovery followed incision of the fibrous capsule of the kidney. The chief change shown microscopically was marked dilatation of the tubules. Thrombosis of the vessels was absent. It was suggested that in cases of puerperal suppression of urine inflammatory swelling producing increased tension within the fibrous capsule of the kidney caused pressure on the collecting tubules and so prevented the urine from reaching the ureter. This hypothesis was supported by the fact that (*a*) in some eclamptic patients passing little water the kidney is hard on direct palpation during Cæsarean section; (*b*) the dilatation of the tubules was present in portions of the kidney removed during operation while the suppression still continued; and (*c*) casts were present immediately after incision of the capsule although they had been absent previously.

Dr. LAPTHORN SMITH said that there were, no doubt, cases like this where suppression was due to pressure on the tubules. In eclampsia, he thought, the suppression was due to pressure on the large veins, and as soon as this was removed the blood could circulate.

Dr. J. S. FAIRBAIRN said that many cases of suppression had no eclampsia at all, and often no symptoms except coma. He disagreed with the previous speaker. In eclampsia it was

a toxin which caused the damage, and opening the capsule would do little good.

Dr. H. RUSSELL ANDREWS said that anuria was only part of eclampsia; the most remarkable part was the profound toxæmia.

MEDICAL SOCIETY OF LONDON.

Epidemic Encephalitis.

A MEETING of this society was held on Dec. 9th, Dr. A. F. VOELCKER, the President, being in the chair, when Dr. E. FARQUHAR BUZZARD read a paper on Lethargic Encephalitis, which appears in full on page 835 of our present issue.

Discussion.

In the course of the discussion Mr. PERCY SARGENT spoke of the appearance of the brain, &c., during life, as seen at the time of operation. The dura mater was friable or thickened, and there was blood on the surface; the cortex was friable. Operation had been of no use in either of these cases, but might prolong life. A better method might be repeated lumbar puncture.

Dr. F. G. CROOKSHANK, speaking from the epidemiological point of view, said they had no right to distinguish between epidemic prevalences and to say that they were due to a different disease because of difference in seasonal and in age incidence.

Dr. J. G. GREENFIELD agreed that this was not a new disease. There was negative evidence from the clinical, bacteriological, pathological and epidemiological points of view that it was not the same disease as poliomyelitis. Positive evidence showed that poliomyelitis was a lymphogenous infection—was carried by the lymph stream—whereas this was a hæmatogenous infection, the blood-vessels bearing the brunt of the disease.

Dr. EDMUND CAUTLEY also spoke.

Dr. BUZZARD, in reply, agreed that if one could recognise these cases for certain one would not decompress. With regard to Dr. Crookshank's contention, he said that encephalitis was a prevalent disease. From the clinical standpoint there was a form of encephalitis like poliomyelitis and due to the same virus. From the pathological side he had examined numerous cases of encephalitis of the poliomyelitis type, and in these it was difficult to say where the infection began or ended; the whole nervous system was affected. In lethargic encephalitis, on the contrary, the condition was patchy. Poliomyelitis was an inflammation of the nervous matter; lethargic encephalitis was an inflammation of blood-vessels with *consequent* effect on nervous tissues.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF SURGERY.

Military Surgery of the Lung.

A MEETING of this society was held under the chairmanship of Sir JOHN W. MOORE.

Colonel WILLIAM TAYLOR read a paper in which he briefly reviewed the surgery of the lung as carried out at the "front." He showed that the change was simply that of harmonising or adapting the principles of surgery as they are now applied to other wounds to those of the lung and chest. It was estimated that the mortality due to chest wounds at the regimental aid posts varied from 25 to 30 per cent. At the casualty clearing stations the mortality averaged about 18 to 20 per cent., while at the base hospitals it was about 10 to 12 per cent. The average general mortality of chest wounds was about 18 to 20 per cent.—a state of things unsuspected at the beginning of the war. This high mortality, Colonel Taylor said, is due to the fact that shell wounds preponderate over bullet wounds to the extent of 3 to 1. The mortality of shell wounds as compared with bullet wounds is as 14 to 1. It is the septic dangers in connexion with shell wounds that render them so dangerous. The mortality is highest during the first 48 hours, during which time it is calculated that 60 per cent. of the deaths occur. Open wounds of the chest are grave as compared with closed wounds. They are at least twice as dangerous. Lung wounds are like other wounds. They are contaminated by the mere entrance of the foreign body, whether it is retained or not. Like any other wound, there is an area of necrotic tissue which forms a culture medium for the growth of organisms. As with any other wound, in a few hours it will become infected, and the infection will follow the same course. Twenty-five per cent. of wounds of the lung are fatal from hæmorrhage and asphyxia. Surgeons now endeavour to arrest the bleeding by direct surgical intervention at many casualty clearing stations. It has been shown that the operation of thoracotomy has little or no effect upon external blood pressure. Operations can be performed successfully upon the chest and lung in patients with a blood pressure as low as 50 mm. Hg, a point of great practical importance. The gravity of the prognosis of lung wounds is increased considerably by the frequency with which pleuro-pulmonary lesions of the opposite side occur. Infection of the hæmothorax in bullet wounds is exceptional. When there is an opening in the thoracic wall an aerobic infection from without is added to the anaerobic infection arising from the pleuro-pulmonary wound. It is partly on account of this wound infection that open wounds of the thorax are so dangerous. The gravity of chest wounds from the fifth day onwards is due to pleural suppuration much more than to infection of the lung itself. The treatment of penetrating wounds of the lung depends upon whether the wound is superficial, whether the foreign body is retained, or whether the case is one of the through-and-through type. The foreign body is removed where possible together with fragments of bone and pieces of clothing. The track is cleansed and the opening into the lung is carefully closed. This closure tends to arrest hæmorrhage, and will diminish the likelihood of infection of the pleura from the lung. Primary extraction of all foreign bodies from the lung must be considered the rational treatment for preventing infection. Access can be gained to the lung most satisfactorily by an incision from the mid-axillary line to the parasternal region over the fifth rib. Several inches of the rib are incised, and the ribs above and below widely retracted. Openings in the diaphragm must be closed. The entire pleural surfaces are wiped clean and the opening closed by careful adjustment of the tissues in layers. Drainage is not desirable and is not employed; in fact, it is positively dangerous. Gas and oxygen or chloroform with oxygen is the general anæsthesia used, but local anæsthesia may be employed satisfactorily. Ether must never be given. Blood transfusion is frequently given before or after the operation. Morphine is always freely given and camphor injected if necessary. Great care is taken to see that the patient never gets the opportunity of breathing cool air. Watch is kept subsequently to operation for the accumulation of fluid in the pleura, and puncture is performed daily to obtain the fluid for bacteriological examination. Increasing infection of the fluid is generally treated by the removal of one or two stitches and the insertion of a drainage-tube, but repeated aspiration has been successful in many cases. Duval has shown that the lung can be delivered on to the chest wall as intestine may be brought out of the abdomen.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—An ordinary meeting was held on Dec. 6th at the West London Hospital, when a paper was read by Dr. F. J. McCann entitled "Treatment of Some Common Ailments of Women." Dr. McCann first dealt with menstrual disorders, pointing out that frequently such are associated with abnormalities in secretion of one or more of the ductless glands. For amenorrhœa he often found small doses of thyroid extract, at times combined with ovarian extract, productive of quicker results than the usual treatment with iron and arsenic alone. For dysmenorrhœa he advised that everything should be done during the intervals to increase the patient's power of resistance. Brief reference was made to menorrhagia, climacteric disorders, hæmorrhages and discharges from uterus and vagina, together with the treatment of displacement for the latter, of which the best treatment was said to be prevention, the lecturer advocating routine examination six weeks after confinement.—The paper was discussed by the President, Dr. Drummond Robinson, Dr. F. G. Lloyd, Dr. Rickard Lloyd, Dr. Herbert Chambers, Dr. H. H. Sanguinetti, and Dr. J. F. Halls Dally.—Dr. Robinson held the opinion that amenorrhœa was in itself of but little consequence, the cause being far more important. In excessive menstruation he advocated calcium lactate in 30 gr. doses every other night with or without pituitary extract, as recommended by Dr. Blair Bell. For "erosion" of the cervix, in many cases surgical treatment was regarded by him as unnecessary, but if called for he found the old-fashioned cautery best.

Reviews and Notices of Books.

Details of Military Medical Administration. By JOSEPH H. FORD, B.S., A.M., M.D., Colonel, U.S.M.C. Second revised edition. Philadelphia: P. Blakiston's Son and Co. 1918. Pp. 816.

THIS book is fortunate in being introduced by a letter of Surgeon-General Gorgas, who hopes that every medical officer in the U.S. Service will furnish himself with a copy. It has been written to help the newly-joined medical officer to observe official technicalities. The keynote of the book is contained in the following sentence:—

"If a physician, however eminent in his profession but without preliminary training, is suddenly called upon to discharge highly technical administrative duties, the sick and wounded under his care will inevitably suffer because of his inability to secure the supplies necessary for their welfare, to utilise them to the best advantage, and to properly organise and discipline his personnel."

Although this statement contains a considerable amount of truth, it does not credit medical officers with the powers of initiative and adaptability which many have undoubtedly displayed during the War; nor does it take into account the existence of a trained body of men accustomed to deal with these matters. Colonel Ford displays considerable care throughout the book to acknowledge any assistance he has received, and to point out the source of his information. The chapter on the Regimental Surgeon, he states, was written almost entirely by Major Heflebower; on the Ambulance Company by Major McCornack; on the Field Hospital by Lieutenant-Colonel Reno; on the Camp Hospital by Lieutenant Simmons; on Hospital Trains by Major Hart; on the Base Hospital by Captain Kramer and Major Metcalfe; on the Department Surgeon's Office by Mr. Cleave; on Medical Supply Depots by Colonel Raymond and Major Wolfe. Even with this assistance the amount of work entailed by the preparation of the remaining 11 chapters must have been very considerable. The most interesting chapter of the book, that on the Evacuation of Sick and Wounded, is evidently written from Colonel Ford's actual observations of events in the field. Perhaps this chapter is the only one which contains much that is new to the average medical man who has served in the British Army. The chapter on Malingering is apparently a compendium of bulky quotations from the works of Allied and enemy writers; although useful, it cannot be read with the same satisfaction as the production of a capable writer with an all-round knowledge of the subject. A considerable amount of repetition occurs throughout the book; many of the regulations for a smaller hospital are much the same as those for a larger hospital, and yet both sets are given. Much of the book is taken up with details of office work. The book is undoubtedly of use to American medical men concerned with military administrative work; although much of the information contained in it is given in our small official publications, such as R.A.M.C. Training, and Field Service Regulations. But it will be well worth the while of the British medical officer to study those parts of the book dealing with active service in the field.

Syphilis, Paludisme, Amibiase: Traitement Initial et Cure de Blanchiment. Par PAUL RAVAUT. Paris: Masson et Cie. 1918. Pp. 88. 4 fr.

THE three protozoal diseases, syphilis, malaria, and dysentery, the treatment of which is considered in this little book, resemble one another, not only in some aspects of their pathology, but more especially in their stubborn resistance to eradicative treatment. That syphilis is not easily eradicated—i.e., cured—has long been recognised, but that malaria is incurable by quinine we have only learned during the war; in fact, too much in the past has been claimed for quinine. We now know that novarsenobenzol will do for simple tertian malaria all that quinine does, but certainly quinine and probably also novarsenobenzol alone will not cure simple tertian malaria. Again, emetine—excellent, apparently, in the initial treatment of amœbiasis—of itself fails to cure even by prolonged administration, though in the form of emetine bismuth biniodide in a large percentage of cases apparent cure is effected. The author is an advocate of combined treatment; for syphilis, mercury and novarsenobenzol for five years; for malaria, quinine and cacodylate of soda for two months; for dysentery, emetine and novarsenobenzol for 40 days, to be followed by 12-day courses monthly or bimonthly. How far two drugs similar in their action—e.g., quinine and novarsenobenzol in simple tertian malaria, emetine and novarsenobenzol in dysentery—are more effective than when either of the two is used singly carefully controlled experimental work alone can show. At present there is evidence in the diseases we are considering that this is so, but it will be some time before proof is furnished. It is fortunate that in malaria and dysentery direct proof is possible, and in syphilis we have the indirect evidence of the Wassermann reaction. For most diseases such proof is from the nature of the case not forthcoming and we are left in doubt whether an "elegant combination" of two drugs with similar action is any better than either of itself. The puzzling fact about the parasites of these three diseases is, How do some survive the drenching with the drugs which kill the others? Pathology or biochemistry is still silent as to this.

Dr. Ravaut's little book is clearly written, and the descriptions of the treatments are brief and practical.

James Hinton. By Mrs. HAVELOCK ELLIS. London: Stanley Paul and Co. 1918. Pp. 283. 10*s.* 6*d* net.

IN his dialogue "Symposium" Plato makes Aristophanes give his version of the primæval nature and state of man. The sexes were originally three, men, women, and the union of the two, having a name corresponding to this double nature, which once had a real existence, but is now lost, and the name is only preserved as a term of reproach.[1]

James Hinton, the subject of Mrs. Havelock Ellis's essay, would seem to have belonged to Aristophanes's third sex, for he was apparently compounded of man and woman, and we would add of a child. He was obsessed with the difficulties of sexual relations, and with the many undoubted hardships which women suffer in their sexual life, whether they are married or unmarried. Prostitution was to him a thing to be made impossible, but we doubt whether the remedy which we gather he proposed—namely polygamy—would be any real remedy. Polygamy existed side by side with prostitution among various ancient races, such as the Hebrews of the Bible, and the ancient Babylonians, just as it does to day among polygamous Mohammedans and Hindoos. But though Hinton was wayward, visionary, and, to our mind, hopelessly unpractical, yet he had in him at least a particle of that divine discontent which has always been a characteristic of reformers.

Lessons on Massage. By MARGARET D. PALMER, formerly Masseuse and Manager of the Massage Department of the London Hospital, and Instructor of Massage to the Nursing Staff; a Founder of, and Examiner to, the Incorporated Society of Trained Masseuses. Fifth edition. Illustrated. London: Baillière, Tindall, and Cox. 1918. Pp. x.-340. 10*s.* 6*d.* net.

SEVEN years ago we reviewed the fourth edition of this handbook, which is characterised by a clear and simple style, making it agreeable reading. The book being written for the student, the scheme followed is that of describing the anatomy of a part and then its treatment. But the medical man who reads its pages will not find this arrangement equally advantageous. He will also have to look elsewhere for help and guidance when directing the treatment of recent injury. The almost complete absence of reference to electrical and hydrological methods, and to the use of gymnastic and mechanical apparatus should be remedied in future editions. We must warn the student against allowing the schematic arrangement of the text to stereotype treatment unduly. A chapter on Swedish remedial gymnastics, which has been added to this edition, is one of the best epitomes of the subject in short space which we have seen.

Treballs de la Societat de Biologia Any V., 1917. Barcelona: Institut d'Estudis Catalans, Barcelona.

THIS attractive volume of 365 pages records eight sessions of the Barcelona Biological Society—six held at the physiological laboratories of the Faculty of Medicine and one each at the gynæcological lecture theatre and the Institute of Sciences. The papers reach a high standard of interest, and a notable feature is an excellent series of coloured microphotographs illustrating histological points in various articles. A portrait of the society's founder, Dr. Enric Prat de la Riba, who died last year, appears as frontispiece.

[1] Jowett's Dialogues of Plato, vol. ii., p. 41.

THE LANCET.

LONDON: SATURDAY, DECEMBER 21, 1918.

The Practice and Teaching of Midwifery.

AN interesting series of articles appeared in the November number of the *Edinburgh Medical Journal* on the Teaching of Obstetrics and Gynæcology to Medical Students. They were contributed by teachers from Edinburgh, London, and Dublin, and on reading them we are driven to the conclusion that the present method of teaching these two important subjects is far from being satisfactory. The majority of the writers are agreed that it is a mistake to attempt to divorce midwifery from gynæcology, they are too interdependent; and while the present method of teaching gynæcology is perhaps sufficient for its purpose, the same is certainly not true of the teaching of midwifery. It is not possible, nor is it necessary, that the student on entering private practice should have any very extended knowledge of the diseases of women; he should be able to recognise the normal, and should be familiar with the commoner abnormalities, but beyond this his knowledge cannot extend. Experience will follow, and in the meantime counsel is readily available. In midwifery, however, the requirements of the young practitioner are quite different: at any moment he may be called upon to treat a grave complication of labour, and upon his ability to do so properly and skilfully may depend the lives of both mother and child. Acute gynæcological cases calling for immediate treatment or operation are rare; acute complications in labour threatening the life of the mother are not uncommon, and require for their recognition and treatment a complete and well-grounded knowledge of the subject.

If the time-tried methods adopted for teaching midwifery in Edinburgh are faulty it cannot be maintained that the methods in vogue in most of the medical schools in London are any better. A medical student immediately after attending a course of systematic lectures on midwifery may have to take duty in the extern maternity department, and while theoretically he is supposed to conduct his first case under the supervision and with the help of the extern maternity assistant, it happens not infrequently that he does so with the assistance only of another student knowing little more than himself; and, indeed, in some instances he has to attend entirely alone. At some hospitals he is required to act as clerk in the lying-in wards for a certain time before taking up duty in the extern department; but as in the case of most hospitals accommodation for their students is not available in the immediate neighbourhood, and as labour cases occur at any hour of the day or night, the student may never actually have been present even at a normal labour before taking charge of his first case in the district. If he is accompanied by the extern assistant, the latter is usually a recently qualified man with perhaps no aptitude for teaching, even if he has the necessary knowledge and experience, which usually he has not. By the time the student has finished his month's term of duty in the extern department he may have been present at a varying number—possibly 20, 30, or even 40 labours. If they have all been normal he may have had no teaching from anyone, and generally is not in a position to learn much for himself; he will have been unlucky, though the ease with which he has completed an important section of his education may betray him into thinking the reverse. If he has been really lucky he has had one or more abnormal cases, and has seen these delivered by the assistant in their own homes, or possibly after admission to the lying-in ward. It is extremely unlikely that he will have seen a single case conducted by anyone senior to an obstetric registrar, and only in very rare instances will he have had the advantage of a demonstration on a patient in labour by one of the obstetric physicians to his hospital. It is true that in recent years an attempt has been made to improve the teaching of midwifery by certain examining bodies insisting upon the attendance of students on a certain number of cases in the wards of a lying-in or general hospital. Here again, however, the main part, if not all, of the teaching at the actual confinements is done by junior assistants or registrars, and very seldom indeed by any member of the visiting staff. No one could pretend that this state of affairs is satisfactory; and, indeed, no one wishes to do so. It is certainly most unsatisfactory and requires prompt remedy. But what can be suggested to ensure that the student shall receive teaching of the same standard and by the same class of teacher in midwifery that he is accustomed to receive in medicine and surgery? With a continuance of the present conditions this, frankly, is impossible. Clinical teaching in medicine, clinical teaching in surgery, and surgical operations can all be arranged at a fixed time to suit the convenience of the teacher and the student. This is not so with a case of labour; only too often this occurs at a time when it is physically impossible, under the conditions obtaining at present, for any member of the visiting staff to attend, and when any teaching that is done must devolve upon some junior resident officer or a registrar. The teaching of midwifery in London, and indeed in most of the cities of this country, requires complete reorganisation. The fact must be recognised that while attendance in an external maternity department is well calculated to give the student confidence, the surroundings of the patient are entirely unsuited for proper teaching. Clinical instruction in midwifery can only be carried out in the well-appointed wards and theatres of a lying-in hospital, and to be done efficiently must be done by senior members of the staff with the knowledge and experience necessary to give such important teaching.

There is only one solution of the problem—the provision of lying-in hospitals in this country in

sufficient numbers on the model of the Rotunda Hospital in Dublin, officered by whole-time senior and properly qualified teachers resident in the hospital, whose services therefore can be obtained at any time. These whole-time teachers must be paid a salary sufficient to attract really good men, who must be supplied with all that they require for their teaching—whole-time paid assistants, properly equipped clinical laboratories in which they may be able to carry out research work, and in which all the pathological work essential to proper clinical teaching can be conducted. Every student must be required to go into residence so that he may take duty in the lying-in wards for at least one month, and his attendance on his cases must be under proper supervision and with the assistance of as good clinical teaching as at the present time he can obtain in medicine and surgery. Under the same roof he should be able to carry out his clinical work, not only in midwifery, but also in gynæcology, and no attempts should be made to separate these two subjects. Until properly equipped and officered hospitals for lying-in cases, with provision for the carrying on of a maternity and child-welfare department in close association, are provided in London, the teaching of midwifery will never be upon a proper basis, and the reproach that the science of midwifery has been woefully neglected, and that no research work of any value has been carried out in this subject by the London school for many years past, will continue to hold good.

Primitive Agents in Treatment.

FIRE, air, earth, and water have always been the chief agents of mischief, and HAHNEMANN might have claimed their influence in support of his homœopathic principle, for the same quartette, artfully applied, are the most generally useful remedial agents, and as such have largely come into their own during the past four years. Fire has superseded other methods of disinfection and disinfestation on a large scale in many war areas, and in the form of radiant heat has relieved the disabilities of wounds. Air has been the universal remedy of trench life, and has transformed vast numbers of anæmic men, rendered anæmic by a stuffy indoor habit of life, into the fit and sunburnt warrior. The rôle of earth, sinister in providing the source of horrible wound infections, has been to provide also the vaccines by which the same infections have been prevented. Water has played the leading part in the continuous irrigation of wounds, doubt existing in regard to many chemical agents whether they do more than add a therapeutic aroma. It is noteworthy that on these four primeval things the teaching of public health is built up, or at all events the arrangement of hygienic text-books. For in the near future, in which preventive and remedial treatment are to be more closely combined, physical agents are likely to reassert their place in therapeutics challenged by the fine chemicals industry. From the relief of symptoms medicine is steadily working back to the removal of the cause of the malady in the individual subject, and from this to the larger causes in groups, in communities, and in nations. Water especially has too long been despised as a therapeutic agent. NAAMAN found, as many others after him have found, that it looks too simple. But within our own time water has been vindicated again and again over against chemical agents in the reduction of fever, for which it has the inestimable advantage of being safe. Any patient may have an antifebrin idiosyncrasy, but tepid sponging offers no risks. The compulsory diversion of chemical agents to warlike purposes has led many medical men to fall back upon physical agents in treatment, we doubt not with permanent advantage.

It is in this sense that we construe the plea for the increased recognition of physical treatment raised by Dr. FRANK RADCLIFFE in our correspondence columns this week. He enumerates a portentous list of conditions which can be successfully dealt with by physical methods, and which, as a matter of actual experience, have been thus successfully dealt with during the war. Army discipline, applying physical methods, has done wonders in training men in speed, alertness, and agility, in raising muscular tone, and in giving confidence and that conscious sense of well-being attendant on robust health. Physical treatment can, Dr. RADCLIFFE contends, be of equal service in restoring the unfit to a state of fitness or, failing that, to the maximum point of utility. But Dr. RADCLIFFE adds, and we endorse, a grave warning against physical treatment falling into unqualified hands. Whether Government can prevent the public being gulled by quacks and charlatans we do not know, but undoubtedly the glowing career of the unqualified physical specialist would soon pale if the medical profession itself were to give the guiding hand in physical treatment of all kinds. The practitioner has, largely of his own free will, surrendered any say in these matters to those without scientific training, and the first requisite is to set our own house in order and to make sure that physical treatment is placed on a satisfactory scientific basis. This cannot be done without accurate knowledge and research, and a chair of hydrology at one of our leading universities would be the fitting commencement of such a reform.

The treatment of the disabled man gives an excellent opportunity of putting these principles into practice. France and Italy have already been to the fore in making physical treatment available on a large scale under medical supervision. The agricultural colonies at Port Villez, Juvisy, Martillac, Milan, Poscia, and Palermo have already proved the value of what Professor SILVIO ROLANDO, of Genoa, calls the veritable resurrection of the soldier doing the agricultural cure. In agricultural work a great variety of exercises is possible all day long, whereas mechanical devices are more limited in kind and duration. Great numbers can be treated in field work without requiring a little army of skilled operators, and the interest is kept up by nature and not killed by machines. Ordinary physical treatment is often carelessly carried out, motions without aim are repeated without energy, and soon forsaken as being without interest, or at all events leaving a sense of boredom and insincerity. A memorandum issued by the Village Centres Council[1] for the

[1] See Village Settlements for Disabled Men. A scheme to combine restorative treatment with industrial and social reconstruction. THE LANCET, 1917, ii., 692. The present address of the Village Centres Council is 5, Little College-street, London, S.W. 1.

Curative Treatment and Training of Disabled Ex-Service Men gives the following summary of the experience in France:—

Agricultural work as a method of cure requires close supervision by medical men who have made themselves experts. Experience in France has shown that the agriculture cure centre should be residential and in the country. The convalescent soldier cannot be trusted to take his farming at home; he works either too little, too much, or in the wrong way. Wounded men can be sent at an early stage from the hospital to supervised work in the fields. Many go to work with open wounds. It has been proved that suppurating wounds heal more quickly under open-air work than in hospital. Long-continued muscular contractions give the "deep massage" needed to force out waste and poisonous products. French surgeons, convinced by an examination of men cured by agricultural work, are now asking that men should be sent at once from the hospitals to the fields. Splinters of bone and foreign bodies in suppurating wounds are soon discharged when daily work is commenced. It has taken four years to find this out. Many men with small and superficial wounds of recent origin should go at once to the fields.

The centre which the Village Centres Council hopes shortly to open at Enham in Hampshire, whilst officially recognised by all relevant Government Departments, is yet largely based upon experience gained abroad in the agricultural cure. The treatment will be chiefly on physical lines, and combined with training also carried on under medical supervision. Room will be found for village trades and handicrafts, and for intellectual and artistic training for those who need them, but the chief feature of the Centre will consist in curative agricultural work in the open air. The Centre is obviously one adapted to assist in the most practical way the demobilisation of men for industries on the land. All those who value physical treatment will earnestly wish the Centre success.

Christmas.

THE public are rejoicing at the release of a moderate store of good things by Government Order through the festive season of Christmastide. The great Christian festival is rightly one of good cheer, and the present occasion particularly invites rejoicing at home, when the end of the vast struggle has come, though leaving the heavy burden of readjustment and the stimulating tasks of reconstruction. Sensible people will need no warning as to excesses, and the material falling away from old standards of plenty should remind all of the indecency of luxury at this period. Its danger must also be recalled. After a period of restraint indulgence is unusually dangerous to health. The food limitations of the war have taught many valuable lessons, which have brought home the evil of excess. The nation has behaved splendidly over these restrictions, and its health has been well maintained; surely it is not now to be jeopardised by lust. During the festive season we are promised a release of flesh foods, such as turkey and beef, the former requiring no coupon and the latter to be supplied on double ration allowances. The public will welcome these concessions, but will hardly need reminding that it would be folly to give way to indulgence after a course of compulsory training in abstinence. Let Christmas be a merry season but a wisely spent one. Let those whose lot has been more happy remember the countless homes where the prevailing spirit must be, at the great season of family gathering, one of irremediable loss.

Annotations.

"Ne quid nimis."

GERMAN CIVILIAN HEALTH.

DURING the war it has been difficult to gather unbiased information regarding the health of the civilian population of enemy countries. But some exact, if scanty, evidence is now forthcoming. At the instigation of the editor of the *Deutsche medizinische Wochenschrift*, Dr. Behla, director of the medical department in the Prussian Registrar-General's Office, has analysed the deaths attributed to heart disease and apoplexy during the years 1912 to 1917. Cardiac deaths rose from a total of 63,400 in 1912 to 76,000 in 1917, the increase being about 20 per cent. in the towns and 10 per cent. in the country. 1914 already showed a surprising increase on 1913 in the urban districts, where the stress of mobilisation was evidently very great. During the same six-year period deaths from apoplexy remained much more constant, a slight urban increase being balanced by a slight rural decrease. The maximum in both town and country occurred in 1915, and the following year showed a drop to below the normal. Dr. J. Schwalbe, in commenting on the figures, claims the great increase in heart failure as a war sacrifice, brought on by a combination of psychical stress, bodily fatigue, and lowered nutrition. In the same number of the journal he adverts to the grave risk of epidemic disease from the demobilising army, especially in the East, the danger being greatest in regard to venereal diseases. The situation in this respect has, he states, been rendered more acute by the partial relaxation of discipline after the revolution among the troops, who, largely under the influence of alcohol, gave way to sexual indulgence in greater degree than under normal military restraint. An Army Order has been issued instructing the examination of soldiers of all grades for transmissible disease before demobilisation. In the case of cholera, typhus, yellow fever, plague, or small-pox the discovery naturally precludes demobilisation altogether. The same is the case in regard to the usual notifiable exanthems. In the case of other infectious diseases, including suspects and carriers—and in this category come syphilis, gonorrhœa, and scabies—the men are isolated for treatment on their own express wish, but detention is not enforced. The ex-soldier's attention is then called to the risk of spreading disease among his family circle and to the need of keeping under medical supervision. These measures seem to us, as to Dr. Schwalbe, sadly inefficient, and a large dispersal of venereal infection among the civil population is to be expected.

THE COMPLEMENT-FIXATION TEST IN TUBERCULOSIS.

THE Wassermann test for syphilis was recently on trial in our columns; the similar test for tubercle needs no less a critical examination, and the exhaustive article by Dr. Edward Fidlar, Captain, C.A.M.C., on the Complement-fixation Test in Tuberculosis in our present issue raises many questions which deserve an answer, if answer can be given. Dr. Fidlar has carried out the test on 570 Canadian soldiers, and in so doing has investigated a number of bacteriological problems which have hitherto made this particular serological test

one of the most difficult to interpret, both pathologically and clinically. The earliest research on the subject largely centred round the difficulty of finding a sensitive antigen and one which at the same time would not confuse the issue with cross-fixation of complement in syphilis. Dr. Fidlar is in agreement with most recent workers in considering a suspension of living tubercle bacilli the most satisfactory antigen. With two slightly different methods he obtained 74 and 77 per cent. of positive reactions in active pulmonary tuberculosis. By means of slight modifications in technique he was able to increase this percentage, but the fact that the method gave 21·8 per cent. of positives in cases clinically not considered tuberculous suggested that increased sensitiveness was not altogether an advantage. Dr. Fidlar's careful work once more raises the question: Is the complement-fixation test of practical value in the diagnosis of tuberculosis? Up to the present it must be regretfully acknowledged that the earlier hopes of the bacteriologist in this direction have not been fulfilled. It is not sufficient to obtain a positive reaction in cases of active tuberculosis which are already obvious to simpler clinical tests. A serological test, if it is to be really useful, must help the physician in the diagnosis of incipient pulmonary tuberculosis, of bone and glandular tuberculosis; it must also differentiate between active disease and arrested and quiescent lesions; whilst finally it must be free from technical laboratory difficulties, such as cross fixation of complement. Perhaps this is too high a standard to demand of any serological test at present, but, unfortunately, the exigencies of the situation demand it. Judged by this standard, the opsonic index, the various tuberculin reactions, and a host of less common tests have been found wanting. It is therefore no depreciation of Dr. Fidlar's admirable piece of work—which has effectively consolidated the present position—to say that complement fixation has not yet given us, what we need, a reliable serological test in tuberculosis.

THE HYGIENE OF THE NOSE.

MORBID conditions of the upper respiratory tract play a large part—some authorities believe a predominant part—in the catarrhal diseases of urban life. Among school children, indeed, nine-tenths of prevalent illness has been credited to catarrhs. In spite of this, little is really known regarding the root causes of adenoids, atrophic and hypertrophic rhinitis, sinusitis, and hoc genus omne. All sorts of theories and explanations have been advanced, none of which has been found satisfying. It may well be that each of these conditions, as well as many others, is due to a specific infection. This is almost certainly the case with the common "cold in the head" where the virus is ultramicroscopic, and with atrophic rhinitis where the agent is the cocco-bacillus of Perez. In these and other similar inflammations nature attempts a cure by increasing the flow of mucus-carrying lymphagogues, which destroy the infecting organisms and neutralise their toxins. It is not very generally recognised that to a large extent these catarrhal infections are due to organisms which grow in the mucus on the surface of the membranes lining the air passages, and that it is their toxins which irritate the mucosa and cause it to inflame. The resulting swelling gives rise to obstruction, in which back-waters are formed wherein the microbes breed undisturbed by currents of fresh air, like the flies in the stuffy corner of a warm living room. To obtain a cure the first essential is to improve nasal ventilation and to make sure that all the recesses and pockets of the naso-pharynx are aerated. Nearly all the lower organisms are worried by currents of air. Secondly, an attempt should be made to improve the quantity and quality of the lymphagogues, this being presumably the way in which most antiseptics, vaccines, and the like, produce their effect. A nasal lotion or spray acts in both ways, partly by clearing the passages and partly by exciting the flow of mucus. In THE LANCET of Nov. 9th Dr. F. J. Woollacott suggested menthol inhalation as a form of nasal toilet combining both these factors. The nasal drill advocated by Mrs. Hancock is efficient in so far as it clears the passages, an important factor in young children, although not the whole story. Her especial merit rests on the emphasis laid on the direction of the clearing: "blowing down, not sniffing up" is her motto, and if she had her way children would be trained to the downward sniff from the tender age at which reflexes are still plastic.

A SMALL-POX OUTBREAK IN TEXAS.

THERE are two types of small-pox met with in the United States, the first, which is the most prevalent, being of a mild kind, with a case-mortality rate of about 1 per cent.; the second is of a more virulent form and commonly arises from imported infection, mainly from Mexico, where the disease is endemic, its fatality rate ranging from 20 to 30 per cent. The States on the Mexican border are much exposed to this imported infection, and Texas is one of the most frequent sufferers from it. A recent illustration of this is given in the *United States Public Health Reports* for Sept. 20th by Assistant Surgeon C. R. Eskey, of the U.S. Public Health Service. Eagle Pass, in Texas, is a small town with 6500 inhabitants, situated on the banks of the Rio Grande, which here forms the boundary between Mexico and the United States. Opposite, on the Mexican side of the river, is another small town, Piedras Negras, the two being connected by a bridge, guarded on the northern side by the U.S. Customs and other officials who examine all travellers entering Texas. But it is easy to ford the river unobserved at other points, and often infection is conveyed across the borders in this way. During 1917 small-pox was prevalent in Piedras Negras and its vicinity, about 1000 cases with 200 deaths coming under notice. Towards the end of 1917 the disease began to spread in Eagle Pass, where during the first three months of 1918 there occurred at least 150 cases, of which 33, or 22 per cent., died. There is a large Mexican population living in Eagle Pass, amounting to about two-thirds of the total inhabitants, living under conditions of considerable overcrowding. For instance, in a one-roomed hut there lived 15 persons, 9 of whom contracted small-pox. It was found very difficult to persuade the Mexican part of the population to be vaccinated, there being a strong belief among them that vaccination during an epidemic caused an outbreak of small-pox. The main incidence of the disease was upon persons under 15 years of age, among whom 103 attacks and 16 deaths were reported, while above the age of 15 there were 47 cases and 17 deaths. Thus the fatality rate among the first group was 15·5 per cent., and among the second 36 per cent. Concealment of cases was very frequent. Small-pox being comparatively common among the Mexicans, they regard it lightly notwithstanding its fatality,

and they therefore seldom seek medical assistance, contenting themselves with taking herbal remedies or patent medicines. They regard fresh air as detrimental to the patient, and consequently keep doors and windows closed during the illness. The neighbours consider it a duty to make frequent visits to the sufferers. Under these conditions it was not surprising that small-pox spread. Dr. Eskey mentions that at Eagle Pass dogs were blamed for conveying small-pox infection from one house to another. Most Mexican families keep one or more dogs, and these are the pets and playfellows of the children, frequenting the sick-room when any members of the family are attacked by small-pox or other diseases. The usual gravity of variola when it attacks a pregnant woman was noted, abortion resulting, usually with a fatal result. Dr. Eskey mentions several instances where second attacks of small-pox occurred. The circumstances of this outbreak are instructive and not without a lesson to ourselves in view of the possible occurrence of a small-pox epidemic when our soldiers return and the pent-up traffic of the past four years is liberated and begins to arrive at our ports from foreign countries.

A NEW SIGN OF SCIATICA.

AT a meeting of the Société Médicale des Hôpitaux of Paris on Nov. 11th Professor M. L. Rimbaud described a new sign of sciatica—effacement of the retro-malleolar fossæ. He referred to the importance of the region of the tendo Achillis in the diagnosis of sciatica. In addition to the reflex of this tendon, its sensibility to pressure and the lowered tone of the note obtained by percussing it are points to which attention has been drawn. In examining cases of sciatica and surgical lesions of the sciatic nerve at a military neurological centre, Professor Rimbaud has been struck with the peculiar appearance of the region of the tendo Achillis on the affected side. Instead of its normal appearance of a tense cord up to the point of insertion, the tendon was often less apparent and the two fossæ which separate it from the malleoli were effaced; the tendon appeared broadened, and the part œdematous. In the most typical cases the salient of the tendon disappeared, the retro-malleolar fossæ were no longer apparent, and the posterior part of the ankle took on a flattened characteristic appearance. This sign was especially observed in wounds of the whole sciatic nerve or of the internal popliteal. In medical cases of sciatica it was observed frequently; the more severe the disease the longer its duration. This sign was found in 70 per cent. of surgical lesions of the sciatic nerve and in 25 per cent. of medical cases of sciatica. Professor Rimbaud proposed for it the name "signe de l'effacement des gouttières rétromalléolaires," or, more simply, "effacement rétromalléolaire." He thought that it was simply due to loss of tone of the muscles of the calf, just as diminution of the gluteo-femoral fold is due to loss of tone of the muscles of the buttock. Such loss of tone, producing relaxation and depressibility of the tendon and, in certain cases, lowering of the heel, has been previously described. This relaxation effaces the retro-malleolar fossæ. Indeed, if the muscles of the calf be seized with the fingers and drawn upwards the effacement disappears. To observe this sign the patient should kneel on the edge of the bed or on a chair, as in examining the tendo Achillis reflex, or he should stand on a chair or table, so that the region of the tendo Achillis is well exposed.

THE ANNUAL REPORT FOR 1917 OF THE CHIEF MEDICAL OFFICER OF THE BOARD OF EDUCATION.

I.

IT is just ten years since the School Medical Service was established by law as a universal system in England and Wales. Sir George Newman's latest annual report, coming at the end of a decade of more or less experimental work and synchronising, as it does, with the cessation of hostilities in the great world war and with the passing into law of a new Education Act for England and Wales, which boldly enlarges the health activities of local authorities, is of necessity of more than ordinary interest and importance. It more than marks a milestone on the long road towards national health and efficiency. It at once closes a chapter of chequered experiment and heralds an era of more assured advance.

Retrospect.

Very properly, therefore, a section of the report is devoted to a review of the work of ten years, 1908–1917. The causes and conditions are recounted which led up to the legislation which brought the School Medical Service into being. It came at the end of a century of growing revulsion against the tragedy in respect of child-life which accompanied the industrial revolution in England. Already in 1908 the general problem was less one of rescuing the child from shocking and desperate conditions of hardship, cruelty, disease, and death, and more one of protection against disease, of building up the child's physique, and of providing such medical care and education as would lay the foundation of healthy childhood and adolescence. Two Acts had already been passed providing for the care and education of defective children, two official reports of investigations into the physicial condition of children of school age and their premature employment had been issued, and there were the reports of the Interdepartmental Committees on Physical Deterioration (1904) and on Medical Inspection and Feeding of Children attending the Public Elementary Schools (1905), the former of which first revealed the now obvious fact that the foundation of the public health rests upon the health of the child population. It is strange that Sir George Newman in his enumeration of the causes and events which led up to the passing of the Education (Administrative Provisions) Act does not include the Boer War and the amount of unfitness in the population which recruiting at that time revealed. This, to those of us who were then stirred by the necessity of improving the national physique, stands out as the one compelling factor. It was on a smaller scale a foreshadowing of the awakening to the need for reconstruction and effort which the great war now happily ended has brought about.

In the course of the review the machinery organised during the 10 years for the carrying on of the School Medical Service is described. A national system "as complete of its kind and more universal than elsewhere in the world" is at work in all the 318 educational areas of England and Wales. In 1915 (before the temporary depletion on account of the war) there were 1300 medical men engaged in the service. In 1917 a School Dental Service employing 200 school dentists had been established by 151 local education authorities out of a total of 318. In 1915 there were 1500 school nurses employed in 291 areas. Fifty-five authorities had made some arrangements for medical treatment in 1908, 279 in 1917. It is estimated that about 60 per cent. of the children found to be defective on medical inspection are receiving treatment. Taking London alone, the medical and dental provision in the 1910 scheme was for 2500 children; in the present scheme (1918–19) provision is made for 164,500 children.

The practice of physical training and the teaching of hygiene has since 1909 become universal in all training colleges and every educational area in England and Wales. In 1908 there were 304 special schools for blind, deaf, physically and mentally defective, epileptic, and tuberculous children, accommodating 17,610 children; in 1917 there were 413 similar schools, accommodating 31,470 children.

The maladies and disabling defects of many children are being put right which were formerly being neglected. Other substantial gains include the raising of the standard of cleanliness—beyond question the most paramount of hygienic needs, while profound educational results have brought

about a new understanding of the scope and opportunity of preventive medicine. Amongst these results are the influence upon the parent, the fuller appreciation of the individuality of the child, and the effect upon the methods and practice of education.

The experience of the ten years has shown that there has been an increase in the sense of responsibility of the mother, with the result that the child is better fed and receives more, rather than less, maternal care than formerly; the education authorities have found that, whatever may be attempted in the class-teaching of children in the mass, it is impossible to inspect, follow up, treat and care for the child except as an individual, and this discovery is exerting a deep influence upon the whole orientation of education. The far-reaching lesson has been learnt that it is primarily upon the child's physical and mental health that his welfare and upbringing depend.

Lest the reader should be too carried away by noting these advances the report hastens to add that the organisation is as yet incomplete in operation, inadequate in working and even in scope, insufficiently coördinated, and not yet yielding anything like its full measure of benefit. Particularly weak is the machinery in relation to anthropometry, a subject of national value and importance, and even such elementary auxiliaries as school baths, open-air schools, and adequate physical training are still, in most educational areas, lacking.

Sir George Newman in grave words states that it is incumbent upon him to say that the experience of a decennium has shown that the physical impairment of school children is wide in distribution, serious in degree, and grave in its effect upon adolescence and adult life. We profess to be astonished and depressed by the magnitude of the sickness claims upon the National Health Insurance, as well as by the large rejection of recruits; but we have been sowing the seeds of this harvest during long years of neglected maternity, neglected infancy, and neglected childhood, and long years of failure to organise or to understand adequately preventive medicine.

Medical Inspection.

The Code requirements are that provision must be made in every elementary school for the medical inspection of all children admitted to the school in the year, of all children between the ages of 8 and 9 years, of all children between 12 and 13 years of age, together with children over 13 years of age who have not already been examined after the age of 12. Normally on these requirements upwards of 2,000,000 children should be examined in the year; in 1917, however, the number was only 1,362,063. These figures suggest a decrease in the examinations of 31·9 per cent., due to curtailments consequent on the war.

In about 100 areas medical inspection was undertaken on the basis of "ailing children." The view of the London authority which experimented during 1916 with the examination of entrant children on an ailing basis was that the arrangement was unsatisfactory, because it failed to detect existing ailments. The Board endorses this view. "The School Medical Service is not a dispensary system; it is an educational system of preventive medicine."

The effects of the war in relation to the School Medical Service have been twofold. First, there has been serious disturbance of the machinery of the service, and, secondly, there has been anxiety regarding the depressing influences of war conditions upon the health of the children. Under the first heading there has been the depletion of the medical and nursing personnel on the staffs of the local authorities and constant changes militating against efficiency; many care committees are dissolved or in abeyance, and home conditions have been profoundly modified in some ways with a deleterious effect. Under the second head there have been apprehensions with regard to the suffering of the children from food rationing, high prices, lessening of parental control, daylight saving, and air-raids. It is satisfactory to learn from the report that there is a consensus of opinion that none of these has produced any ill results upon the children, with the reservation that parental preoccupation has led to an increase in uncleanliness and its associate conditions. Sir George Newman, it is true, appears to accept the view that the Daylight Saving Act has, in some areas, deprived the children of an hour of sleep daily. Having given the impression that the effects of the Act in so far as they influence the health of the children are wholly bad, it would have been satisfactory if he had given more evidence in the support of this belief and discussed at least whether there were not countervailing advantages.

No doubt, resulting from the dislocation of the machinery of the service, there is no section of the report devoted this year to the findings of medical inspection throughout the country. Instead there is given the findings of a "control experiment" designed to check the results of previous examinations and eliminate as far as possible the disturbing factors inherent in a national system of medical inspection. Two sets of 300 unselected elder children, each in typical London and country schools, were inspected by one competent and experienced medical officer examining all 600 children on one schedule and by one standard. It was a "surprise" examination without notice or warning, including absent children as well as those in attendance at school, and had regard to the effect of the physical condition of the child on its education. The inquiry is reported in detail, and in order that the standards adopted should be better appreciated the report contains a brief description of the condition of a number of normal and defective boy and girl scholars.

The conclusions to be drawn from this control inspection are driven home by Sir George Newman with considerable force.

1. In the London group 7 per cent., and in the country group 10 per cent., of the elder children on the roll were absent from school on grounds of more or less chronic ill-health.

2. After deduction of the blind, deaf, mentally and physically defective and invalid children of this age-group, there were of the children present at school 21 per cent. found to be suffering from various defects "which interfere with their profiting to a due and reasonable extent from the educational facilities provided, and which will prevent them from playing their fair and proper part as citizens."

3. Of these elder children present at school 12 per cent. were ill-nourished; 19 per cent. were unclean in body; of the London children 40 per cent., and of the country children 65 per cent., had some carious teeth; 11 per cent. suffered from disease of nose and throat; 10 per cent. had "very serious" defects of vision, whilst another 13 per cent. had defective eyesight of slightly less severity; 6 per cent. suffered from defective hearing; of middle-ear disease there were 4 per cent. of sufferers.

4. Upwards of one-third of all these elder children are in London at least two or more years behind their normal school standard; there was a very definite accumulation of defective children of the higher ages in the lower standards, and physical defect appears to be one of the chief causes of backwardness in school.

5. The London children with sound dentition formed 60 per cent., the country children 35 per cent. The London children suffering from disease of nose and throat were 5 per cent., the country children 21 per cent. The London children furnished 2 per cent. of verminous heads, the country children 8 per cent. These differences would appear to be due, in the main, to the facilities of treatment, cleansing and supervision provided by the London County Council, which are not similarly available for the country children.

The number of children comprised in this model inquiry is not large, but the broad results are sufficiently close to those found on a large scale throughout the country to justify Sir George Newman in his comment that it seems futile to attempt to reform education apart from the physical condition of the child; that it seems unreasonable to expect healthy adolescence and healthy citizenship if we continue to neglect the remedy of the physical disabilities of childhood and the prevention of their cause.

Medical Treatment.

Speaking generally, the arrangements of the local education authorities for medical treatment have been maintained. In a few areas there has been a considerable extension of activities in 1917. 279 authorities made some arrangements for medical treatment, 231 provided school clinics, 95 contributed to hospitals, 223 made provision for supplying spectacles. On the contrary side, 87 authorities made no provision for treatment of minor ailments, 167 none for dental defects, 92 none for errors of refraction, 95 none for supply of spectacles, 208 none for treatment of enlarged tonsils and adenoids, and 234 none for treatment of ringworm (X rays). It is unsatisfactory to learn that there are still one-third of the children known to be in need of treatment who do not receive it.

Under the heading "Partially Blind Children" many interesting facts are given in relation to the establishment

of special schools for myopic children. It appears that more than 20 such schools now exist and that during the past year eight new schools of this character have been certified by the Board in London alone. At Bradford a scheme is in operation whereby it is considered that the myopia will, by special methods of instruction, be rendered stationary, and that after two years the affected children may return to the ordinary methods of instruction with safety.

Special prominence is given in the report to the arrangements for treatment of defective vision, of enlarged tonsils and adenoids, and of ringworm, but it is strange to find that otorrhœa is dismissed as a minor ailment unworthy of special note. Otologists, as well as school hygienists, are more and more recognising that in this condition we have one of the gravest dangers to the life of school children, one of the chief causes of educational incapacity in deprivation of hearing, and a frequent cause of chronic ill-health. Children with this disease are the despair of out-patient departments and school clinics alike, and it would be a welcome step if the Board of Education would take the lead towards the establishment of adequate provision for dealing with this disabling complaint, for which, in many cases, conservative operation involving in-patient treatment is the only means of cure.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary meeting of the Council was held on Dec. 12th, Sir GEORGE H. MAKINS, the President, being in the chair.

The SECRETARY reported the death, on Nov. 21st, of Mr. Nottidge Charles Macnamara, past Vice-president and past member of the Council. The following resolution of condolence was carried:—

"That the Council hereby express their deep regret at the death of Mr. Nottidge Charles Macnamara, and their sincere sympathy with the members of his family in their bereavement. The Council do also record their appreciation of the many services rendered to the College by Mr. Macnamara as a Vice-president and member of the Council, and of the active part he took in professional and educational matters during a long and distinguished career in India and in this country."

A report was read from the Board of Examiners in Anatomy and Physiology for the First Fellowship stating that at the recent examination there were 36 candidates, and of these 15 were approved and 21 were rejected. A report was also read from the Court of Examiners stating that at the recent examination for the Final Fellowship held on Nov. 15th, 18th, 19th, and 20th there were 22 candidates; of these 3 passed, and it was resolved to grant diplomas of Fellowship to those qualified to receive it. The diploma of Fellow was conferred on:—

William Bashall Gabriel, M.B., B.S. Lond., M.R.C.S., L.R.C.P., Middlesex Hospital, and William Edward Gallie, M.B. Toronto, Toronto University.

Captain John Isaie Keen, M.B. Lond., M.R.C.S., L.R.C.P., although successful in the examination, will not receive the diploma of Fellow until he has attained the age of 25 years.

Mr. V. Warren Low, surgeon to St. Mary's Hospital and lecturer on surgery to St. Mary's Hospital Medical School, was elected a member of the Court of Examiners.

The PRESIDENT reported the delivery by Mr. D'Arcy Power on Nov. 14th last of the Bradshaw Lecture on Cancer of the Tongue. The best thanks of the Council were given to Mr. Power for his lecture and he was requested to publish it.

A letter was read from Mr. S. H. Coplans asking, on behalf of himself and 14 other students of Guy's Hospital, the Royal Dental Hospital, and the National Dental Hospital (including six ex-Service men), that the following proposal be placed before the Council and Board of Examiners in Dental Surgery:—

"In view of the military situation and other circumstances that at present obtain that the February examination in the final subjects for the Licence in Dental Surgery of the Royal College of Surgeons be re-instituted."

The Council decided not to alter their decision to hold First and Second Professional Examinations for the L.D.S. only twice a year—viz., in May and December.

The Council proceeded to the consideration of a letter from the Board of Scientific Societies asking for the comments of the College in reference to the draft report of the Metric Committee of the Board. The Council decided to reply that they approved generally of the recommendations in the report of the committee.

The PRESIDENT reminded the Council that the Hunterian Oration was to be delivered by Sir Anthony Bowlby on Feb. 14th next.

THE Royal Dental Hospital, Leicester-square, has received a grant of £50 from the Corporation of the City of London.

The War and After.

THE CASUALTY LIST.

THE names of the following medical officers appear among the casualties announced since our last issue:—

Died.

Col. H. G. Melville, C.I.E., I.M.S., was educated at Edinburgh, and qualified in 1890. He held an appointment for some two years at the Edinburgh Royal Infirmary, and then entered the Indian Medical Service. Later he was attached to Lahore Medical College, where he was professor of materia medica. He saw service in 1894 in the Waziristan campaign and in 1897 in the Punjab and in the Tirah campaigns. In 1916 he was appointed consulting physician to the Mesopotamian Expeditionary Force, in connexion with which he was mentioned in despatches and awarded the C.I.E. He died at Baghdad.

Capt. J. M. Gage, R.A.M.C., qualified at Dublin in 1910, and held appointments at Mercer's Hospital, Dublin, and at Noble's Hospital, Douglas. At the time of joining the R.A.M.C. he was senior assistant medical officer at the Royal Earlswood Institution, Redhill, Surrey.

Capt. D. P. Lindsay, R.A.M.C., qualified at Edinburgh in 1912, and prior to joining up was in practice at Gateshead-on-Tyne.

Capt. G. E. Keith, R.A.M.C., qualified at Edinburgh in 1887, and was at one time assistant to the professor of clinical surgery at the Royal Infirmary, Edinburgh. Prior to going on active service he was in practice in Manchester-square, London, and was the author of several articles in the medical press, and of a text-book of abdominal surgery. He died in Italy of influenza.

Capt. D. Cotterill, R.A.M.C., was educated at Cambridge and at Edinburgh, and qualified in 1906. Prior to joining up he was in practice at Edinburgh, where he was assistant surgeon at the Royal Infirmary. He died in France of pneumonia.

Surg. Lieut. M. E. Jones, R.N., was a student at St. Thomas's Hospital, London, and qualified this year.

Capt. R. S. Armour, R.A.M.C.

Capt. J. Donaldson, R.A.M.C.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Capt. G. E. Keith, R.A.M.C., died in Italy of influenza, youngest son of the late Dr. T. Keith.

Capt. D. Cotterill, R.A.M.C., died in France of pneumonia, eldest son of Lieut.-Col. J. M. Cotterill, C.M.G., R.A.M.C.

Capt. H. J. P. Creagh, Suffolk Regiment, died of wounds at Le Tréport, only child of Major S. H. Creagh, late R.A.M.C., of Haughley, Suffolk.

THE HONOURS LIST.

The following awards to medical officers are announced:—

The Victoria Cross.

Capt. BELLENDEN SEYMOUR HUTCHESON, Canadian A.M.C., attd. 75th Bn., 1st Central Ontario R.—For most conspicuous bravery and devotion to duty on Sept. 2nd, when under most intense shell, machine-gun, and rifle fire, he went through the Quéant Drocourt Support Line with the battalion. Without hesitation and with utter disregard of personal safety he remained on the field until every wounded man had been attended to. He dressed the wounds of a seriously wounded officer under terrific machine-gun and shell fire, and, with the assistance of prisoners and of his own men, succeeded in evacuating him to safety, despite the fact that the bearer party suffered heavy casualties. Immediately afterwards he rushed forward, in full view of the enemy, under heavy machine-gun and rifle fire, to tend a wounded sergeant, and, having placed him in a shell-hole, dressed his wounds. Captain Hutcheson performed many similar gallant acts, and by his coolness and devotion to duty many lives were saved.

Distinguished Service Order.

Capt. DAVID WILLIAM McKECHNIE, 6th Fd. Amb. Can. A.M.C.—For conspicuous gallantry and devotion to duty. While preparing an advanced dressing station in a village, it was subjected to an intense bombardment, but he remained at his post dressing the wounded, and refused to take underground cover.

Major STANLEY GRAHAM ROSS, M.C., 6th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty. On three successive days this officer was in charge of collecting posts and advanced dressing stations. He accompanied the stretcher-bearers in the advance, to see that proper touch was maintained. His coolness and disregard of danger under heavy fire had an excellent effect on the work of the bearer parties.

Col. ROBERT MILLS SIMPSON, Can. A.M.C., A.D.M.S., 2nd. Can. Division.—For conspicuous gallantry and devotion to duty in establishing, often under heavy fire, his advanced dressing stations and collecting posts, and personally superintending the evacuation of the wounded. When a sudden attack resulted in the capture of a village, he went up under fire and personally dressed the wounds of his men on the field, evacuating all by the evening. His tireless work undoubtedly saved many lives.

Second Bar to Military Cross.

Temp. Capt. (acting Major) **ROBERT MASSON GREIG, M.C.**, 63rd Fd. Amb., R.A.M.C.—He displayed conspicuous gallantry and great devotion to duty in attending to the wounded and superintending their evacuation from advanced positions. To his admirable organisation and self-sacrificing endurance, working without rest or sleep, many wounded men owe their lives, and his coolness and courage when leading his stretcher-bearers forward under heavy fire were admirable.

Bar to Military Cross.

Capt. (acting Major) **CHARLES STUART PEDDIE BLACK, M.C.**, 1/2nd (Low.) Fd. Amb., R.A.M.C., T.F.—For conspicuous gallantry and devotion to duty during an advance. Under heavy shell and machine-gun fire he reconnoitred the forward roads and brought up a tent subdivision and set up an advanced dressing station. By his energy and courage he was enabled to clear all wounded from the aid-posts and evacuate them to the main dressing station.

Capt. **CHRISTOPHER MATHESON FINLAYSON, M.C.**, Can. A.M.C., attd. 20th Can. Bn., 1st C. Ontario R.—For conspicuous gallantry and devotion to duty. As medical officer of the battalion during an attack he did excellent work in attending to several wounded men under shell and machine-gun fire. His coolness and attention to duty, regardless of personal safety, were an inspiration to all.

Capt. (acting Major) **WILLIAM MURDOCH, M.C.**, R.A.M.C., S.R., attd. 52nd Fd. Amb.—During three days' severe fighting he was untiring in his efforts, working night and day with his stretcher-bearers, attending to wounded in forward positions and evacuating them rapidly through difficult country. He was severely wounded in the arm by direct machine-gun fire, but insisted on carrying on his duties until he received a direct order from the commanding officer to report to a dressing station. His courage under fire and great endurance were splendid examples to everyone.

Temp. Capt. **PATRICK JOSEPH O'REILLY, M.C.**, R.A.M.C., attd. 7th Bn., E. York R.—For conspicuous gallantry and devotion to duty in attending to the wounded under heavy fire during several days' operations. He advanced with the leading troops in an attack and brought in many wounded men from in front of the lines. He set an inspiring example of coolness and skill.

Temp. Capt. (acting Major) **JOHN McLEAN PINKERTON, M.C.**, 13th Fd. Amb., R.A.M.C.—For conspicuous gallantry in charge of stretcher-bearers. He went forward with some bearer squads to bring in wounded which bearers had been prevented from getting to by machine-gun fire. He ultimately succeeded in bringing in some of the wounded, though fired on every time he was observed. Throughout the operations he showed the greatest zeal and devotion to duty. He was finally severely wounded.

Temp. Capt. (acting Major) **WILLIAM KENNETH ARMSTRONG RICHARDS, M.C.**, R.A.M.C., attd. 55th Fd. Amb.—For conspicuous gallantry and devotion to duty. He followed up an attack under very heavy fire and organised and carried out the evacuation of the wounded during several days' operations with the greatest courage and skill.

The Military Cross.

Temp. Capt. **PATRICK AUGUSTINE ARDAGH**, N.Z. Med. Corps, attd. 1st Bn., Auckland R.—For conspicuous gallantry and devotion to duty. He worked in the open all day under very trying conditions, and at times under heavy fire. Hearing that the personnel of another battalion's aid-post had been blown out, he at once went to the place and worked for several hours under shell fire until he had cleared the wounded. By his energy and disregard for danger many lives were saved.

Capt. **CHARLES FRANCIS ATKINSON**, Can. A.M.C., attd. 44th Bn., Manitoba R.—For conspicuous gallantry and devotion to duty during an attack. Finding that heavy enemy machine-gun fire prevented any carrying back of casualties, he went forward and personally dressed a large number of casualties. Later, under heavy fire, he organised special parties and cleared all wounded effectually. He saved a number of lives.

Capt. **GEORGE RAYMOND BABY**, 4th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty in charge of a stretcher-bearer section which he brought up immediately behind the infantry advance and collected the wounded. He was continuously exposed to every kind of hostile fire. His energy in searching for wounded resulted in his area of the battlefield being thoroughly and quickly cleared.

Capt. **JAMES EVERETT BARRY**, Can. A.M.C., attd. 2nd Bn., Eastern Ontario R.—For conspicuous gallantry and devotion to duty during a successful attack. This officer tended the wounded among the attacking companies under intense fire, dressing their wounds and directing them to the aid-post. He searched the field for wounded under full observation, and frequently under heavy fire of enemy. He must have saved the lives of many men who were lying in exposed positions.

Temp. Capt. **ELLIS CAMPBELL BOWDEN**, R.A.M.C., attd. 2nd Bn., Lond. R.—He attended to wounded men under a very intense fire from machine guns in daylight, and helped to carry many wounded into safety in full view of the enemy. His unceasing efforts and his self-sacrificing disregard of danger saved many lives, and were the admiration of all who saw him.

Temp. Capt. (acting Major) **JOHN BURKE**, 130th Fd. Amb., R.A.M.C.—During ten days' severe fighting he was unremitting in his devotion to duty, tending the wounded and selecting, often in the middle of the night, suitable places for his dressing stations. He displayed conspicuous courage and coolness under fire, and his initiative and endurance evoked the admiration of all who were with him.

Lieut. **FINLAY CAMERON**, R.A.M.C., Spec. Res., attd. 14th Bn., Welsh R.—During many days' hard fighting his courage and devotion to duty were conspicuous. He was continually at work under heavy shell and machine-gun fire attending to the wounded and organising their evacuation. He was wounded himself on one occasion, but remained on duty. His behaviour throughout was admirable.

Capt. **ALEXANDER RAE CAMPBELL**, Can. A.M.C., attd. 5th Bde., Can. Fd. Arty.—For conspicuous gallantry and coolness. When the battery came into action under heavy machine-gun fire a number of men were wounded. This officer collected and carried them to trenches, where he dressed their wounds, constantly under heavy fire. He set a fine example to the men round him at the time.

Lieut. **HENRY ALEXIS CHODAK**, R.A.M.C., Spec. Res., attd. 1/5th Bn., Lond. R.—For conspicuous gallantry and devotion to duty. He was wounded during an attack but refused to withdraw, and remained with the battalion for three more days attending to the wounded, often under heavy fire. He set a splendid example of determination.

Temp. Capt. **ALFRED MACKENZIE CLARK**, R.A.M.C., attd. 1st Bn., North'd. Fus.—For conspicuous gallantry and devotion to duty. Hearing that there were several wounded men lying out that could not be collected until nightfall, owing to snipers and machine-gun fire, he went himself and dressed them in the shell-holes where they lay. On this, as on other occasions, he showed a total disregard for his personal safety when the welfare of the wounded was at stake.

Capt. (acting Major) **FREDERICK CLARENCE CLARKE**, 12th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty. Under heavy shelling he collected four severely wounded men, dressed them, placed them under cover, and remained with them until help arrived, when he got all four away safely. For three days of heavy fighting his cheerfulness and devotion to duty inspired all under him.

Capt. **WILLIAM JAMES DOWLING**, R.A.M.C., Spec. Res., attd. 3rd Bn., M.G. Corps.—For conspicuous gallantry and devotion to duty. He tended and evacuated wounded of his own and other units under very heavy shell and machine-gun fire. Later, he did excellent work in charge of the bearer section of a field ambulance. By his zeal and fearless conduct he saved many lives.

Capt. **HARRY DUNLOP**, Can. A.M.C., attd. 102nd Bn., 2nd Central Ontario R.—For conspicuous gallantry and devotion to duty. This officer followed close behind the attack and attended to the wounded under heavy machine-gun fire. He was untiring in his efforts to care for and evacuate the wounded, and undoubtedly saved many lives.

Capt. **JOSEPH CULLODEN HAGAR**, Can. A.M.C., attd. 78th Bn., Manitoba R.—For conspicuous gallantry and devotion to duty. Throughout the fighting this officer worked unceasingly, ministering to the wounded, frequently under heavy shelling and machine-gun fire. He went without food or sleep, and when wounded refused to leave until his station was cleared.

Temp. Capt. **ORIE ELGIN FINCH**, R.A.M.C., attd. 2nd Bn., K.O. Sco. Bord.—For conspicuous gallantry and devotion to duty. He moved his aid-post forward to close behind the front line under very heavy machine-gun fire. Here he worked unceasingly in a trench for thirty-six hours bandaging and attending to wounded; and it was due to his fearless conduct and splendid energy that all the wounded were attended to in a short time.

Capt. (acting Major) **STANLEY RIDER GIBBS**, 2/2nd (Wessex) Fd. Amb., R.A.M.C. (T.F.).—For conspicuous gallantry and devotion to duty. He organised the finding and evacuation of one officer and four other ranks lying wounded in an advanced machine-gun post in front of our lines, and although the operation, which took several hours, was conducted under almost continuous machine-gun fire, he recovered them all.

Temp. Capt. **BASIL GRAVES**, R.A.M.C., attd. 13th Bn., R. Fus.—For conspicuous gallantry during an attack. He dressed wounded in the open under difficult conditions, and frequently under machine-gun fire. Throughout the operation he encouraged the wounded by his cheerfulness and disregard of danger, and by his devotion to duty saved many lives.

Temp. Capt. **WILLIAM HAMILTON**, R.A.M.C., attd. 223rd Bde., R.F.A.—For conspicuous gallantry during an advance. He remained at the gun positions throughout the operations. Under heavy shelling he attended to wounded in exposed positions, and was always cheerful under most trying circumstances. His courage and devotion to duty won him the admiration of all ranks.

Capt. (acting Major) **WILLIAM JAMES HIRST**, 1st, attd. 2/1st, S. Mid. Fd. Amb., R.A.M.C. (T.F.).—For conspicuous gallantry and devotion to duty in organising the evacuation of wounded from a village during an enemy attack. He remained behind when the enemy advanced into the village and assisted in removing all the wounded, refusing to leave the village until the last man had been brought in. He has at all times shown great coolness and disregard of danger under heavy fire.

Temp. Capt. **JEREMIAH HOLLAND**, R.A.M.C., attd. 1st Bn., Ches. R.—For conspicuous gallantry and devotion to duty. Under very heavy machine-gun and rifle fire he collected and evacuated wounded from a ridge. He showed utter disregard for personal safety, and by his zeal and energy set a splendid example to those under him, and saved many lives.

Capt. **LANCELOT JOHN HUNTER**, Austr. A.M.C., attd. 15th Bn., Aust. Infy.—For conspicuous gallantry and devotion to duty. When the battalion was heavily shelled in a bivouac for two hours he attended to the wounded with utter disregard of danger. During an attack he followed closely behind the attacking troops and attended to the wounded under heavy fire. He set a splendid example of self-sacrifice.

Capt. **BELLENDEN SEYMOUR HUTCHESON**, Can. A.M.C., attd. 75th Can. Bn., 1st Central Ontario R.—For conspicuous gallantry and devotion to duty. Before the battalion reached its jumping off position the enemy put down a heavy barrage and many casualties were sustained. This officer worked unceasingly in attending to and dressing the wounded under heavy fire in open ground. During the mopping up of a village he passed through the streets several times attending to the wounded. He also voluntarily dressed nearly 100 enemy wounded who had been left behind.

Capt. **THOMAS ROSS JAGGER**, Austr. A.M.C., attd. 31st Bn., Aust. Infy.—For conspicuous gallantry and devotion to duty. He carried on his work under heavy fire during two attacks and attended to the wounded of his own and other units with utter disregard of danger. He set a splendid example of courage and self-sacrifice.

Temp. Lieut. **EDWARD DIGBY KINSEY**, R.A.M.C., attd. 1st Bn., Bedf. R.—For conspicuous gallantry and devotion to duty. He remained in the open for over an hour when the battalion were incurring severe casualties from intense shelling, dressing the wounded and seeing that they were promptly carried into safety. His efforts resulted in the saving of many lives.

Temp. Capt. **ALEXANDER CHESTER LAMBERT**, R.A.M.C., attd. 8th Bn., R. Lan. R.—For conspicuous gallantry and devotion to duty. He repeatedly established aid-posts during an attack and under very heavy shell and machine-gun fire attended and evacuated wounded belonging to his own and other units. When a shell struck his aid-post, killing assistants and slightly wounding himself, he remained at duty and refused to go down. Throughout the operations his conduct was admirable.

Capt. **PHILIP WHITESIDE MACLAGAN**, R.A.M.C., attd. 1st Bn. Herts R.—For conspicuous gallantry and devotion to duty. He continued to bind up wounded on a road under shell fire. He also showed great ability in getting wounded evacuated from the aid-post; and generally showed great coolness and disregard of danger under fire throughout the operations.

Capt. (acting Major) EDWARD BERTRAM MARSH, R.A.M.C.—For gallantry and marked devotion to duty during an advance. He kept touch with the regimental medical officers' and bearer divisions under very adverse circumstances and heavy fire, and so coördinated the forward evacuation that the divisional front was cleared in the shortest possible time. His energy was remarkable throughout the operations.

Capt. JAMES KILBURN MOSSMAN, 5th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and tireless energy in the execution of his duty. This officer was in charge of a section of stretcher-bearers, and rapidly organised the evacuation of the wounded. He followed close on the attacking infantry waves, and regardless of his own safety attended to the wounded. His zeal and judgment were a great example to the men.

Capt. FINLAY MUNROK, Can. A.M.C., attd. 52nd Can. Bn., Manitoba R.—For conspicuous gallantry and devotion to duty in dressing and attending to wounded during a hostile barrage. This officer has always disregarded personal danger, and has undoubtedly saved many lives on the battlefield.

Capt. (now Maj.) SYDNEY MICHAEL O'RIORDAN, Austr. A.M.C., attd. 13th Bn., Aust. Infy.—For conspicuous gallantry and devotion to duty. During the later stages of an advance, when the infantry were under heavy fire, he established his aid-post in an advanced position and dealt very rapidly with the casualties. His initiative and coolness under heavy fire were an inspiration to all who came in contact with him.

Temp. Capt. ANDREW FINLAY READDIE, 21st Fd. Amb., R.A.M.C.—For conspicuous gallantry and devotion to duty. While supervising the evacuation of the wounded from the front line he heard that a medical officer in charge of stretcher-bearers had been killed. He at once proceeded to the spot through heavy enemy barrage and took charge of the bearers, and it was due to his prompt action that no delay resulted. He has consistently done good work.

Capt. LOUDON CORSAN REID, 12th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty. For several hours under heavy rifle and machine-gun fire he dressed and cleared wounded, and by his efforts saved many lives. He several times went forward to points of extreme danger to satisfy himself that all wounded had been cleared.

Temp. Capt. JOHN JOSEPH REYNOLDS, R.A.M.C., attd. 15th Bn., Hamp. R.—For conspicuous gallantry and devotion to duty. He formed an advanced regimental aid-post on the side of the road, thus shortening the stretcher-bearers' journeys. Eventually he was forced to evacuate this position owing to hostile fire. Later, he dressed and attended to all the casualties of three battalions, though partially gassed himself. By his untiring energy he undoubtedly saved many lives.

Capt. FRANK ELLIOT TRENOWETH TRUE, Aust. A.M.C. attd. 48th Bn., Aust. Infy.—For conspicuous gallantry and devotion to duty. He moved forward with the assaulting troops under very heavy fire, established his aid-post and organised his stretcher-bearers, and was the means of saving many of the wounded. He carried out his duties under heavy fire with great skill and courage.

Capt. FRANCIS LOUIS TRINCA, Austr. A.M.C., attd. 2nd A.L.H.R.—For conspicuous gallantry and devotion to duty. During an attack this officer, although suffering from fever, carried out his duties with great energy and total disregard of danger. Later, he accompanied the troops in a counter-attack, attending to casualties in the open under fire, and setting a fine example of endurance.

Capt. ALBERT HENDERSON WALLACE, 13th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty. While in charge of five stretcher squads he followed a battalion into action and established collecting-posts for the wounded directly behind the battalion. His courage and initiative enabled the wounded to be got out rapidly, thereby saving many lives.

Capt. WILLIAM CHARLES WALSH, 13th Fd. Amb., Can. A.M.C.—For conspicuous gallantry and devotion to duty. With four squads of stretcher-bearers he followed the battalion into action and established collecting-posts a few hundred yards behind the front line. He dressed and evacuated wounded under heavy shell fire, working all day and night in the open until all were carried off the field. He behaved splendidly.

Capt. ERNEST HAROLD WHELPLEY, Can. A.M. Corps., attd. Hdqrs., 3rd Bde., Can. Gar. Arty.—For conspicuous gallantry and devotion to duty. He at once went to a battery which was being heavily shelled, and as casualties occurred dressed their wounds and superintended their evacuation. He showed great coolness and devotion to duty.

Temp. Capt. WILLIAM BROCKIE WILSON, R.A.M.C., attd. 1st Bn. Devon R.—For conspicuous gallantry and devotion to duty. He treated the wounded of his own and other battalions; this involved passing backwards and forwards over shell-swept areas. Later he went forward with his stretcher-bearers and searched all the ground up to the front line. He showed splendid zeal and disregard of danger, and set a fine example to those under him.

Capt. PAUL ERNEST VOSS, A.A.M.C., attd. 58th Bn. Aust. Infy.—For conspicuous gallantry and devotion to duty. He worked at his aid-post under heavy fire throughout two days' operations, and attended to the wounded of two divisions. He set a fine sample of courage throughout, and undoubtedly saved many lives.

The following awards are in connexion with operations in the White Sea and in the Adriatic respectively:—

Distinguished Service Order.

Surg. Lieut. JOHN GREENLAW DOBSON, R.N.; H.M.S. "M25."—Though wounded by the explosion of a shell, he carried out all operations that could be effected on the wounded, working continuously from 7 P.M. till 10 P.M., when he collapsed. Throughout this time Surg. Lieut. Dobson went about his work as if nothing had happened.

Surg. Lieut.-Cdr. CYRIL VERITY GRIFFITHS, R.N.

FOREIGN DECORATIONS.

French.

Legion of Honour.—Commander: Surg. Vice-Admi. Sir W. H. Norman, K.C.B. Chevalier: Surg. Cdr. W. W. Keir, C.M.G., R.N.

OBITUARY OF THE WAR.

JOHN DOW, M.B., CH.B. ABERD.,

CAPTAIN, INDIAN MEDICAL SERVICE.

Captain J. Dow, who died at Shiraz, Persia, on Nov. 5th, at the age of 29 years, was eldest son of Peter Dow, headmaster of the West End School, Elgin. He was educated at his father's School, Fordyce Academy, and the Elgin Academy, and graduated with distinction at Aberdeen University, taking the M.A. degree in 1910 and the M.B., Ch.B. in 1915. He was then house surgeon to Professor J. Marnoch at Aberdeen Infirmary, and before going to India in 1916 held a commission in the R.A.M.C., being attached to the Highland Casualty Clearing Station at Aberdeen. Captain Dow had performed valuable work in India, Mesopotamia, and Persia, spending 18 months at Shiraz, where he was actively engaged in combating the cholera epidemic. His death was due to influenza.

FRANK CECIL HARRISON, M.R.C.S. ENG., L.D.S.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain F. C. Harrison, who was killed in action in Belgium on Oct. 13th, at the age of 26 years, was eldest son of the late Frank Harrison, M.R.C.S., L.D.S., of Sheffield. He was educated at Sheffield Grammar School and King Edward VII. School. He then studied dentistry at the Royal Dental Hospital, London, and attended Sheffield University as a medical student, taking the diplomas of the Conjoint Board in 1915. An enthusiastic worker in the Officers Training Corps at the University, he obtained the Coronation Medal in 1911. He was gazetted in August, 1914, joined the R.A.M.C. after qualifying, and went out to France in 1915. At the time of his death he was attached to the Duke of Wellington's Regiment in the 49th West Riding Division. The A.D.M.S. of his division writes that he was able in his work and keen in all that pertained to the well-being of his men. "He was brave as a lion and a true friend to us all."

MENTIONED IN DESPATCHES.

In a despatch received from the Commander-in-Chief of the British Forces in Italy, dated Nov. 15th, 1918, the following reference to the medical services occurs:—

The fresh influenza epidemic, which broke out shortly before the commencement of the operations, threw a heavy and additional strain on the medical services. Despite this the evacuation and care of both the sick and wounded were rapidly and satisfactorily carried out. All the arrangements were most ably organised by my Director of Medical Services, Major General F. R. Newland, C.B., C.M.G.

In connexion with operations in the Sudan the name of Major A. Gibbon, R.A.M.C., is brought to notice for distinguished and gallant service in the field.

The names of Surg. Lieut.-Cdr. W. E. Ormsby, R.N., and of Surg. Lieut. L. F. Strugnell, R.N., have been mentioned in despatches dealing with operations in the Adriatic.

Correspondence.

"Audi alteram partem."

THE VALUE OF PHYSICAL TREATMENT.

To the Editor of THE LANCET.

SIR,—The Prime Minister in his speech on Nov. 16th, in placing the case for the Coalition at the Central Hall, Westminster, said: "The health of the people must especially be the concern of the State. This is one of the war's revelations." Might I be allowed to express in your columns my views regarding the adoption of physical treatment in a State scheme of medical service?

During the past four years physical treatment in all its branches has made great progress; it has been universally adopted, and the War Office in 1915 recognised the important rôle it plays in the treatment of men who are suffering from the many after-effects of disabilities contracted in the war. Dr. Fortescue Fox and others have, through the Royal Society of Medicine and other channels, left no stone unturned in their endeavour to inform the profession what could be done in this country and what was being done in other countries. Its adoption has been to a very large extent in conjunction with orthopædic treatment, and most of the institutions where these cases are treated possess complete physical treatment installations. Cases pass from the surgical or medical sides of a hospital to the after-treatment or physical treatment department, and remain there until no further improvement can be attained.

I should like to enumerate a few of the conditions which can be successfully dealt with by these methods—viz., hydrology, electricity, massage, exercise (active and passive).

1. Debility from any cause, e.g., pneumonia, typhoid, dysentery, all post-operative conditions, e.g., appendicitis, hernia, &c.
2. Rheumatism, including myositis, myalgia, fibrositis, rheumatoid arthritis, osteo-arthritis, both in the earlier stages.
3. Neuritis, including neuralgias of all kinds, particularly headaches, which are often of rheumatic origin due to fibrositis of the cervical muscles.
4. Nervous conditions, including neurasthenia, loss of nerve tone, general tremors and insomnia associated at the present time with the overstrain of war and shell shock.
5. Heart conditions, particularly arrhythmia, tachycardia, bradycardia, loss of myocardial tone; dilatation whether associated with valvular disease or not.
6. Post-operative conditions, such as adhesions following abdominal operations, contracted scars producing deformity by the trapping of nerves or tendons.
7. Fractures with only fibrous union; in other words, deficiency of callus.
8. Paralysis and paresis of any nerve, more particularly facial, ulnar, median, musculo-spiral, sciatic and branches.
9. Synovitis and fibrous ankylosis of large or small joints where breaking down of tissue and re-education of movement are necessary.
10. Circulatory conditions, such as trench feet, post frost-bite, and erythromelalgia.

There are many other conditions which might be mentioned where physical treatment is indicated. It is the accurate and direct therapeutic application of exercise in its many forms which is absolutely necessary to ensure a scientific and well-balanced method of procedure. Most of the men in our Army have been brought under discipline for the first time in their lives, and training in speed, alertness, agility, the strengthening of flabby and weak muscles, all combine to give them a feeling of well-being, confidence, and fitness to which they have been strangers.

Professor Tait McKenzie, of Pennsylvania University, who has served as a Major in our Royal Army Medical Corps, in taking part, on his return to America, in a discussion on a paper concerning the Reconstruction and Rehabilitation of the Disabled Soldiers, says:—

"In the inspection of training camps (in the early days of the war), which ran from 30,000 to 80,000 men, it was my duty to travel from one to the other, and we repeatedly found a number of men who were unable to take full training. Now these were paraded, and in the course of examination we found that many of them were suffering from conditions that could be cured by proper treatment, sometimes by operation, but more frequently by some form of physical therapy that would bring them back to military usefulness. The number of these was very considerable."

During the past two and a half years 10,000 officers and men have been treated by physical therapy in the department of which the writer has charge. Of this number 45 per cent. have finally been passed fit. These statistics show what physical treatment can accomplish in restoring the unfit to a state of fitness or, failing that, to the maximum point of utility. I trust that the authorities who formulate the scheme of State medical service will bear in mind the important rôle played by this form of treatment. It will certainly replace many bottles of medicine and benefit the patient by Nature's remedies. But I would emphasise that the application of physical therapeutics to pathological conditions must depend for its success upon careful selection and accuracy of the dose employed, and also on persistence in following a course of treatment. It is the neglect of these considerations which is responsible for most of the failures in their application. The physician often fails to appreciate the range and effectiveness of the most powerful and versatile system of therapeutics which is always at his command.

I should like to say that there is a very grave danger of this form of treatment falling into unqualified hands, and I beg to suggest that the Government should take steps to prevent quacks and charlatans from gulling the public by unprofessional advice and unskilled treatment. At present there is no law to prevent these individuals from opening elaborate treatment rooms and advertising, and thereby gaining distinct and unfair advantage over the qualified practitioner.—I am, Sir, yours faithfully,

FRANK RADCLIFFE,
M.O. 1/c Treatment.
Western Command Depôt, Heaton Park, Manchester.

ADVANCES IN THE TREATMENT OF FRACTURES.

To the Editor of THE LANCET.

SIR,—Having seen in THE LANCET of Dec. 14th Dr. R. Scot Skirving's description of his visit to No. 8 Stationary Hospital I would like to add my appreciation of the work that has been done there. Personally I do not believe that any man has afforded the wounded soldier more freedom from physical anguish than Major M. Sinclair has. On the occasion of my last visit to that hospital in November I was much struck by the excellent series of specimens illustrating the various fractures of bones resulting from projectiles. These were beautifully mounted and the innumerable comminuted fragments were collected and secured in position with perfect accuracy. They will make a valuable addition to a collection such as the Keogh War Museum at the Queen's Hospital at Sidcup. The cases in the wards showed how it was possible by the proper use of glue and by other means to obtain accurate axial continuity of fragments, even in the worst cases of comminution. They illustrated the importance of leaving as many fragments as possible in the wound, since they served after a time to make abundance of new bone. Perhaps one of Major Sinclair's devices which has proved most effective and painless is the use of screws inserted into the long bones. These afford secure holds on which traction can be readily exerted. At this hospital the accuracy of Sir Almroth Wright's view is fully borne out by the use of dry gauze dressings, no antiseptic having been employed for over two and a half years. It must be a great source of satisfaction to British surgeons that their fellow countryman has been able to do so much for surgery by putting it upon a definite scientific basis. If one were asked to allot credit for the work done by British scientists and surgeons in this war I would conclude that that of Sir Almroth Wright has been of the greatest scientific importance to surgery, and that of Major Sinclair of the highest clinical value to the wounded soldier.

I am, Sir, yours faithfully,

Dec. 14th, 1918. W. ARBUTHNOT LANE.

THE LONDON UNIVERSITY ELECTION: A PROTEST.

To the Editor of THE LANCET.

SIR,—You have very justly placed our postcard below Sir Wilmot Herringham's angry letter of protest in your last Friday's issue, and it will be seen that we simply point out the probability that the medical candidate, not being a

graduate of the University of London, will only alienate votes from the Coalition candidate, which on public grounds we should greatly deplore. From his letter it might be feared that if he were returned Sir Wilmot's methods of controversy, whilst adding to the liveliness of the House, would scarcely enhance the dignity of his adopted University.

I am, Sir, yours faithfully,

London, Dec. 14th, 1918. R. DOUGLAS POWELL.

SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—Owing to the demands upon your limited space, my remarks at the meeting of the Section of Anæsthetics of the Royal Society of Medicine, as reported in THE LANCET of Dec. 14th, have been necessarily abbreviated, and two points which I think are of some importance have been omitted. I should like to be allowed to refer to them.

The first point is that there has been a misconception of the nature of the two solutions commonly employed in spinal anæsthesia. The specific gravity of Barker's stovaine-glucose solution is 1·023, that of the stovaine-saline solution 1·083. The former, however, has always been called the "heavy" solution, the latter the "light" solution, and has been used as a "light" solution, the patient being placed very soon after injection in the head-down position. The fall of blood pressure being largely compensated by gravity, pallor, sweating, faintness, and collapse have been less frequent and less severe, and Barker's solution has been gradually ousted from its former position of predominance. Gravity can, however, be made use of with advantage when Barker's solution is injected. Diffusion plays a much smaller part in the production of disquieting or alarming symptoms than was originally thought.

The second point is that blood-pressure readings should be taken almost as a routine in spinal anæsthesia. They throw much light on the difficulties of the method, and are valuable in helping the anæsthetist to form a prognosis.

I am, Sir, yours faithfully,

FRANCIS E. SHIPWAY.

Queen Anne-street, W., Dec. 16th, 1918.

HÆMATEMESIS AS A COMPLICATION OF APPENDICECTOMY.

To the Editor of THE LANCET.

SIR,—In THE LANCET of July 6th there is an article by Dr. E. Drybrough-Smith on hæmatemesis as a complication of appendicectomy. I have had two cases following appendicectomy similar to the case he records, but, unfortunately, with not the same happy ending.

CASE 1.—I was called to see a patient, 19 years of age, suffering from appendicitis; with rest in bed, she got better. About three months afterwards she had a similar attack, which likewise subsided, and to prevent future attacks she desired an operation. On Oct. 18th, 1914, she went into a nursing home. The next day menstruation commenced, and as there was no urgency the operation was postponed until the 29th. During the interval of waiting in the home she was on full diet, under observation, and did not complain of any abdominal pain. This is important, because the question of gastric ulcer might arise in a girl of 19.

On Oct. 29th I removed her appendix; there were a few adhesions, but there was no difficulty whatever about the operation. She was put to bed in good condition. About eight hours after the operation I was called to see her, as she did not seem to be doing well. She had a very fast pulse, was very pale and very restless, and was evidently suffering from hæmorrhage. Though there was no swelling or discolouration about the wound her condition pointed so strongly to hæmorrhage that she was given an anæsthetic, and the wound was reopened, for fear a ligature had slipped, but everything was found in order. About four hours afterwards she vomited a large quantity of coffee-ground vomit; she was given a hypodermic injection of morphia and atropine and teaspoonfuls of water containing 10 minims of adrenalin extract every half hour. This treatment did no good, and she kept vomiting the same kind of vomit, and died about 24 hours after the operation.

Case 2.—In September, 1916, when surgeon with the French Red Cross, I was asked by a French colleague, a physician, to see a little girl, 10 years of age, whom he was treating for appendicitis. A diagnosis of appendicular abscess was agreed upon, and she was taken to a military hospital for operation. I found a big abscess in which there was a gangrenous appendix; a portion of omentum was also gangrenous. This and the appendix were removed. A large cigarette drain was put in the abscess cavity and the child returned to bed. in a much better condition than before operation. About six hours after the operation the night sister who had charge of the child sent for me. The child was very restless and very pale and was clearly suffering from hæmorrhage; there was no blood escaping from the drain, but to make sure there was no hæmorrhage at the site of operation the wound was reopened, but there was no sign of bleeding there. About 12 hours after the operation she brought up a large quantity of coffee-ground vomit, and continued vomiting until she died 16 hours after the operation. In neither case could I get a post-mortem examination.

Osler, in his text-book, mentions operations in the abdomen as being a cause of hæmorrhage of the stomach, particularly when the omentum is wounded. He also states that many cases have followed operations for appendicitis, the complication being very fatal. There is an article in Moynihan's "Abdominal Operations" on post-operative hæmatemesis in which many theories are mentioned as to the cause. He states that, as a rule, the amount vomited is small—this was not the case in the two patients I have seen. The question is also discussed in Keen and Da Costa's "System of Surgery," in an article by Van Hooke and Kanavel.

The consensus of opinion seems to be that the hæmorrhage arises from small erosions in the gastric mucosa. If I ever have the misfortune to meet another case I should try hypodermic injections of serum. Serum is a useful adjuvant in cases of hæmorrhage.

In a case I saw recently of severe epistaxis, in which oozing persisted after plugging the posterior nares with plugs soaked in adrenalin, the bleeding ceased after an injection of antidiphtheritic serum used in lieu of plain serum.

I am, Sir, yours faithfully,

J. VERE ARKLE, M.D., F.R.C.S.

Kalgoorlie, Western Australia, Oct. 9th, 1918.

THE CAUSES AND INCIDENCE OF DENTAL CARIES.

To the Editor of THE LANCET.

SIR,—Dr. J. Sim Wallace begins the introduction to his book on the Prevention of Dental Caries as follows: "Dental caries is one of the most easily and certainly preventable of diseases." Is this true? If so, it is a scandal that the details of its prevention are not known to every father and mother in the civilised world. It is impossible to exaggerate the terrible state of the teeth in this country, the disease and economic loss following the dental caries.

I urge you, Sir, to demand a Government Commission to inquire into the matter at once. This is what the President of the Dental Association of New Zealand said to the Acting Premier last July: "The examination of thousands of school children in New Zealand shows the percentage of those suffering from dental caries to be 95. If cows were similarly affected they would not be tolerated for one month." It is my firm belief that Dr. Sim Wallace has solved the problem.

May I point out that three articles of food, which taken in large quantities are believed to be most pernicious, have been very scarce as regards the first two, unobtainable as regards the third—i.e., (1) milk; (2) manufactured sugar and sweets; (3) soft white bread and finely milled flour in biscuits. Cow's milk belongs to the calf, and milk is the correct food for the toothless young only. Manufactured sugar, in the enormous quantities consumed before the war, is a modern article of diet; previously we made our own sugar. There is all the difference between the native grinding and chewing the cane for his meal and the concentrated article in the sugar-basin. Wholemeal bread *must* be well chewed; it cannot be bolted like the soft white of pre-war days. How are the children to-day? Apart from influenza, which is prevalent throughout the world, their health is excellent. Mr. H. J. Morris, in a letter to THE LANCET dated April 2nd, 1918, states: "It is easier and cheaper to feed children on preventive lines than as they are generally treated." The matter cannot rest where it is to-day. Are we to teach the public prevention, which costs nothing, or are we to supply an army of dental surgeons to fill the teeth of the whole community?

In my lectures to the soldiers under my care on "Why Does the Tooth, the Hardest Part of the Body, Rot in the Nursery and the Schoolroom?" I have pointed out that I never saw a case of appendicitis amongst the poor country Arabs under my care in Egypt before the war; that no girl ever came to me with a history of indigestion and subsequent gastric ulcer; that cancer, which so often attacks some part of the alimentary canal, was practically unknown to me; that tonsils and adenoids never came my way, the last possibly because practically all the children were breast-fed.—I am, Sir, yours faithfully,

W. E. NICKOLLS DUNN,
Horton War Hospital, Epsom, Dec. 7th. 1918. Major, R.A.M.C.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Temp. Surg.-Lieut. C. K. Scales, who has been invalided on account of ill-health contracted in the Service, to retain his rank.

ARMY MEDICAL SERVICE.

Col. D. M. O'Callaghan, C.M.G., is placed on retired pay.

Headquarters of Administrative Services and Departments.

Temp. Major G. O. Taylor, Canadian A.M.C., to be Deputy Assistant Director of Medical Services.

ROYAL ARMY MEDICAL CORPS.

The undermentioned to be acting Majors: Capt. J. E. Hepper; Temp. Capts. H. G. Drake-Brockman and B. Sweeten whilst specially employed.

Temporary Lieutenants to be temporary Captains: S. F. Greenfield, P.'S. Humm, H. W. Knowling, C. W. Joynt, L. H. Butler, F. W. H. Pilot, B. W. H. Fergus, J. G. Millar, J. C. Fox, H. S. Metcalfe, J. A. M. Bligh, G. T. Wrench, H. J. V. R. Allin, D. MacK. Gray, R. J. G. Halden, J. A. Johnstone, F. W. Lawrence, L. A. Morris, R. N. M. Rowstrom, D. B. Wilson, H. L. W. Woodroffe, R. Steel, B. E. Lawrence, A. R. P. Scott, H. Thomson, T. M. Hopgood, J. C. Johnson, G. C. Cossar, F. J. Power, G. Ferguson, R. O'Connor, H. S. Gabb, W. Crerar, F. C. Watson, E. Bottomley, W. Leatherbarrow, E. A. B. Poole.

T. B. Sellors, late temporary Captain, is granted permission to retain that rank.

Officers relinquishing their commissions: Temp. Capts. J. D. Lithgow, H. C. Will, N. W. Walmsley, A. Griffiths (acting Major), D. R. Pike, H. C. Harper, H. A. Mason, G. P. White, A. Tait, H. A. Easton, H. Angel, F. W. K. Lawrie, A. C. Reid (and is granted permission to retain his rank); Temp. Lieuts. M. F. Tylor, C. I. Harmar.

TERRITORIAL FORCE.

Capt. (acting Major) G. T. Willan, D.S.O., is granted the pay and allowances of his acting rank.

General List.—Lieut.-Col. L. J. Blandford to be acting Colonel whilst employed as Deputy Director of Medical Services.

Lieut.-Col. T. F. Dewar to be acting Colonel whilst employed as Assistant Director of Medical Services.

Major G. C. Taylor, from Sanitary Service, to be Major.

2nd London Sanitary Company: Lieut. B. Chaikin to be Captain.

1st Lowland Field Ambulance: Major W. C. Murray to be a Deputy Assistant Director of Medical Services.

3rd West Lancashire Field Ambulance: Major A. A. W. Merrick, from Deputy Assistant Director of Medical Services, to be Major.

1st Home Counties Field Ambulance: Capt. C. H. Gregory, from Deputy Assistant Director of Medical Services, to be Captain.

Sanitary Service.—Lieut.-Col. L. J. Blandford to be Assistant Director of Medical Services, and to be temporary Colonel whilst so employed.

Lieut. Col. T. F. Dewar to be a Deputy Assistant Director of Medical Services.

Major G. C. Taylor to be a Deputy Assistant Director of Medical Services.

Attached to Units other than Medical Units.—Capt. A. S. M. Macgregor to be a Deputy Assistant Director of Medical Services.

TERRITORIAL FORCE RESERVE.

Major G. W. McIntosh, from Attached to Units other than Medical Units, to be Major.

Major (Brevet Lieut.-Col.) C. Rundle, from 1st Western General Hospital, to be Major.

Capt. W. M. Langdon, from the London Field Ambulance, to be Captain.

ROYAL AIR FORCE.

Medical Branch.—The undermentioned are granted temporary commissions as Captains:—T. E. Mulvany (late temporary Captain, R.A.M.C.) and R. J. Aherne (late temporary Captain, R.A.M.C.).

Dental Branch.—The undermentioned (temporary Captains, General List, Dental Surgeons) are granted temporary commissions as Captains: H. F. Barge, C. L. Colbran, C. J. Crocker, J. Speak, and T. F. Healey.

D. H. W. Williamson (temporary Lieutenant, General List, Dental Surgeon) is granted a temporary commission as Lieutenant.

THE Mental After-Care Association for Poor Persons Discharged Convalescent or Recovered from Institutions for the Insane, Church House, Westminster, earnestly appeals for further help to carry on and extend its work, which has largely increased owing to the many shell-shock and air-raid sufferers who have been among the applicants. The results of the work have been very satisfactory, and further particulars will be gladly given by the secretary.

Medical News.

UNIVERSITY OF OXFORD.—At examinations held recently the following candidates were successful:—

SECOND EXAMINATION FOR DEGREE OF BACHELOR OF MEDICINE.

Materia Medica and Pharmacology.—C. K. J. Hamilton, Lincoln; and M. H. MacKeith, Queen's.

Pathology.—H. P. Hodge, non-collegiate.

Forensic Medicine and Public Health.—Y. A. Brown, Exeter.

Medicine, Surgery, and Midwifery.—C. F. Krige, Hertford; A. E. Thomas, University; H. W. Toms, Jesus; and B. Tordoff, St. John's.

UNIVERSITY OF LONDON.—At examinations held recently the following candidates were successful:—

SECOND EXAMINATION FOR MEDICAL DEGREES.

Part II.—Frederick Bach, London Hosp.; Edward Townley Bailey, Middlesex Hosp.; *Cecil Stedman Cloake, Lond. Hosp.; Betty Dent, Lond. Sch. of Med. for Women; Archibald Glen Duncan, London Hosp.; Keridwen Valentine Edwards, Univ. Coll., Cardiff; Gertrude Evans, Lond. Sch. of Med. for Women; Olive Gwendolin Fisk, Girton Coll. and London Hosp.; Richard Kenrick Fou kes, King's Coll.; Nellie Gray, King's Coll. and Westminster Hosp.; Muriel Minnie Harris, Lond. Sch. of Med. for Women and King's Coll.; Hilda May Haythornthwaite and Marjorie Browning Hubert, Lond. Sch. of Med. for Women; Shankar Ramchandra Joglekar, Middlesex Hosp.; Dilys Menai Jones, Univ. Coll., Cardiff; Henry Charles Victor Joy, London Hosp.; Bessie Levin, Lond. Sch. of Med. for Women; William Alexander Low, St. Thomas's Hosp.; Ivan Bailey McCann and Alan McKenzie, Guy's Hosp.; Templar Edward Malins, Univ. Coll., Cardiff; Leslie Stuart Morgan, St. Bart.'s Hosp.; Ernest Rudolf Dudley Nagel, St. Thomas's Hosp.; Bertram Sydney Nissé, London Hosp.; Thomas Stanley North, St. Mary's Hosp.; Rupert John Parry, Univ. Coll., Cardiff; Frederick Alfred Pickworth, King's Coll.; Olive Gwendoline Potter, Girton Coll. and London Hosp.; Edward Horace Richards, Guy's Hosp.; Edith Margaret Ross-Johnson, Cambridge Univ.; Elizabeth Merriman Sanderson and Dorothy Mary Stewart, Lond. Sch. of Med. for Women; William Hedley Summerskill, Guy's Hosp.; Wenefride Thompson and Helen Caroline Tompson, Lond. Sch. of Med. for Women; Frederick H. Wickham Tozer, London Hosp.; and Edith Helen Trimmer, King's Coll. and St. George's Hosp.

* Distinguished in Physiology and in Pharmacology.

CENTRAL MIDWIVES BOARD FOR SCOTLAND.—At the meeting of the Central Midwives Board for Scotland held in the offices, 50, George-square, Edinburgh, Sir Halliday Croom in the chair, intimation was made of the appointment of Sir John Lorne MacLeod as representative of the Convention of Royal Burghs in place of the late Sir Robert Kirk Inches.—The following are the decisions in the cases of midwives heard before the Penal Board:—

No. 1240. For failing to send the proper form for medical assistance in a case of still-birth, &c. The midwife was cautioned strictly to observe the Rules of the Board, and the local supervising authority was instructed to report to the Board at the end of one month upon her conduct as a midwife and as to her fitness to take pulse and temperature.—No. 179. For failing to advise medical assistance in the case of a child suffering from serious skin eruptions and for other breaches of the Rules. The midwife was suspended from practice for one month, and the local supervising authority was instructed to report on her ability to take pulse and temperature before she resumed practice.—No. 1724. For failing to send for medical assistance in a case of ophthalmia neonatorum and for other breaches of the Rules. The secretary was instructed to remove the name from the Roll of Midwives and to cancel the certificate.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee, held on Dec. 10th, 30 cases were considered and £282 voted to 25 of the applicants. The following is a summary of some of the cases relieved:—

Widow, aged 82, and daughter, aged 42, of M.R.C.S. Eng. who practised at Camborne and died in 1892. The daughter has recently had an operation and is now unable to earn. Mother's income £79 from investments and an annuity. Owing to the high price of food unable to manage. Rent £32. Voted £10.—Widow, aged 65, of M.R.C.S. Eng. who practised at Brighton and died in 1898. Was left unprovided for with one daughter, now aged 38, who earns about £20 per annum as daily governess and lives at home. Applicant receives two small pensions amounting to £24. Rent £12. Applicant is now very ill. Voted £10.—Daughter, aged 12½, of L.S.A. Lond. who practised in North London and died in 1914. Mother also dead, and now in charge of an aunt, who applies for help towards clothes and holiday expenses. The aunt is a school mistress with £75 per annum, but owing to increased cost of living finds she cannot continue to keep her niece as she has done in the past. Voted £10.—Widow, aged 61, of M.R.C.S. Eng. who was in H.M. Prison Service and died in 1917. Has two daughters, now aged 37 and 34, working as temporary clerks. Husband left no means, and only income of applicant beyond help from her daughters is a small gift from another charity. Relieved once, £12. Voted £6.—Widow, aged 48, of L.R.C.P. Edin. who practised in Fife and died in 1913. Was left with six children, ages 27 to 10. She earns £30 by clerical work and receives £70 from children. Son on whom applicant mainly depends has been in hospital for three months. Relieved twice, £30. Voted £10 in two instalments.—Daughter, aged 40, of M.R.C.S. Eng. who practised at Streatham and died in 1914. Applicant's income is £20, and she lives with her mother, who also receives help from the Fund, and both are invalids. Relieved four times, £20. Voted £5.—Widow, aged 76, of M.R.C.S. Eng. who practised at Rye and died in 1891. Applicant receives £50 in dividends and lives in own house. A married daughter whose husband is in an

asylum lives with her. Applicant suffers from cataract in both eyes, and is too old to work. Relieved three times, £36. Voted £12 in 12 instalments.—Widow, aged 60, of L.F.P.S. Glasg. who practised at Heaton-on-Tyne and died in 1899. Left with six children, four of whom are married. One daughter, aged 27, at home to look after applicant, who is ill, and son, aged 19, who earns 28s. a week. Relieved 13 times, £142. Voted £12 in 12 instalments.—Daughter, aged 59, of M.R.C.S. Eng. who practised at Liverpool and died in 1893. Applicant was left without means, and is a chronic invalid and quite unable to work. An uncle pays her rent but cannot help further. Relieved 10 times, £114. Voted £12 in 12 instalments.—Daughter, aged 52, of L.R.C.S. Glasg. who practised in India and London and died in 1873. Applicant was left with about £20 per annum, and, being delicate, unable to undertake any regular employment. Relatives help occasionally. Relieved five times, £42. Voted £12 in 12 instalments.—Widow, aged 61, of L.S.A. Lond. who practised at Bournemouth and died in 1913. Was left entirely without means. Receives a pension of £26 from another society and tries to supplement this by taking in lodgers, but has not been successful. Relieved four times, £48. Voted £12 in 12 instalments.—Widow, aged 51, of M.R.C.S. Eng. who practised at Westminster and died in 1911. Applicant was left entirely unprovided for and has endeavoured to earn a living by teaching music, but owing to the war she has not many pupils. Relieved £5 some years ago. Voted £10 in two instalments.

Subscriptions may be sent to the acting honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W. 1.

THE death is announced, on Dec. 13th, at the age of 66, of Dr. George Ogilvie, late senior physician to the French Hospital and to the Hospital for Epilepsy and Paralysis, Maida Vale.

A NURSING HOME TRAGEDY.—A Hove jury on Dec. 12th having returned a verdict of "Death from misadventure," the coroner recorded that Mary Jane Gray died from a fracture of the skull, caused by falling downstairs when struggling to prevent a male patient of unsound mind and insufficiently clad escaping from the house at night. Mrs. Gray was the matron of a nursing home. On Nov. 30th a patient entered with nervous breakdown. He had been a sheep farmer in New Zealand and only married on Nov. 14th. His condition developed into insanity in a very short time, and on Dec. 5th, five days after his admission, he overpowered those in the house, and in the struggle on the stairs the patient and Mrs. Gray fell to the bottom, Mrs. Gray dying from the injuries received. The patient escaped from the house, but was secured and removed to the county asylum. The jury added a rider to their verdict expressing the view that the care of male patients suffering from nervous maladies was not fit work for women alone without assistance, and that it should be enacted that at least one male attendant should be on duty in every nursing home. The coroner agreed to lay the matter before the proper authorities. On behalf of the family the deepest sympathy was expressed to the relatives of the deceased lady.

Communications, Letters, &c., to the Editor have been received from—

A.—Messrs. Abdulla and Co., Lond.; Mr. J. H. Allan, Liverpool; Dr. H. G. Adamson, Lond.; Major A. Abrahams, R.A.M.C.; Mr. R. J. Albery, Lond.

B.—Prof. W. M. Bayliss, Lond.; Mr. H. A. Baylis, Haslar; Messrs. Brown Bros., Lond.

C.—Mr. D. Caird, Lond.; Children's Jewel Fund, Lond., Administrative Committee of; Circle of Scientific, Technical, and Trade Journalists, Lond.; Dr. E. R. T. Clarkson, Lond.

D.—Capt. S. C. Dyke, R.A.M.C.; Dr. R. Donaldson, Reading.

E.—Mr. H. Ellis, Lond.

F.—Mr. C. J. C. Faill.

G.—Mr. T. H. Gunewardene, Lond.; Mr. A. Gaston, Cloughmills; Dr. H. J. Gauvain, Alton; Gaumont Co., Lond.; Dr. E. W. Goodall, Lond.; Dr. A. D. Gardner, Oxford; Capt. M. Greenwood, R.A.M.C.

H.—Dr. G. R. Hall; Dr. J. A. B. Hicks; Sir Thomas Horder, Lond.; Capt. C. W. Hutt, R.A.M.C.; Mr. H. M. Hopkins, Lond.

I.—Dr. S. T. Irwin, Belfast.

J.—Capt. W. H. Johnston, R.A.M.C.; Dr. G. Jessel, Wigan.

K.—Mr. W. H. Kesteven, Kingston Hill; Sapper L. Kelly, R.E.; Dr. F. H. Kelly, Hurstpierpoint.

L.—Major J. R. Lee, R.A.M.C.; Lieut. S. G. Lenzner, M.C., U.S.A.; Mr. E. M. Little, Lond. Mrs. B. H. Leigh, Lond.; Dr. G. C. Low, Lond.; Local Government Board, Lond.

M.—Capt. R. J. Matthews; Medical Supply Association, Lond.; Dr. N. Macleod, Shanghai; Medical Research Committee, Lond.; Metropolitan Hospital Sunday Fund, Lond., Sec. of.

N.—Mr. W. G. Nash, Bedford

O.—Rev. E. G. O'Donoghue, Lond.

P.—Capt. E. W. Pineo, R.A.M.C.; Capt. L. Prideaux, R.A.M.C.; Panel Committee for the County of London; Miss K. Pilkington, Lond.; Major M. G. Pearson, S.A.M.C.; Sir R. D. Powell, Bart., K.C.V.O.; Dr. D. Pennington, Lond.; Major J. Parkinson, R.A.M.C.; Dr. J. Phillips, Bradford.

R.—Capt. H. Robinson, R.A.M.C.; Royal Dental Hospital of London, Sec. of.

S.—Sir G. H. Savage, Lond.; Mr. A. Scott, Lond.; Capt. H. G. F. Spurrell, R.A.M.C.; Dr. E. I. Spriggs, Banff; Surgical Instrument Manufacturers Association, Lond., Hon. Sec. of.

U.—United States Government Committee on Public Information, Lond.

V.—Dr. C. W. Vining, Leeds; Dr. F. Villy, Keighley.

W.—Dr. E. H. Worth, Lond.; Dr. W. H. White, Lond.; Dr. H. Woods, Lond.; Dr. J. A. Wilson, Warrington; Dr. G. D. H. Wallace, Rochester.

Communications relating to editorial business should be addressed exclusively to The Editor of THE LANCET, 423, Strand, London, W.C. 2

THE LANCET, VOL. II., 1918: THE INDEX.

THE Index and Title-page to the volume of THE LANCET to be completed with the issue of Dec. 28th is in preparation. Owing to the continued shortage in the paper-supply, the Index will not be issued with all copies of THE LANCET, as was the custom prior to the War. Subscribers who bind up their numbers are requested to send a *post-card* (which is more convenient for filing purposes than a letter) to the Manager, THE LANCET Office, 423, Strand, London, W.C. 2, when a copy of the Index and Title-page will be supplied free of charge.

Appointments.

ALBAN, EDGAR, M.B., B.S. Lond., M.R.C.S. Eng., L.R.C.P. Lond., Barrister-at-Law (Lincoln's Inn), has been appointed Deputy Coroner in the South-Eastern District to Dr. H. R. Oswald, one of H.M. Coroners for the County of London.

MACCARTHY, D., M.B., Certifying Surgeon under the Factory and Workshop Acts for the Ballyteard District of the county of Cork.

Vacancies.

For further information refer to the advertisement columns.

Alton, Hants, Lord Mayor Treloar Cripples' Hosp.—Asst. Res. M.O. £200.
Barnstaple, North Devon Infirmary.—H.S. £150.
Barrow-in-Furness, North Lonsdale Hospital.—Second H.S. £250.
Bedford County Hospital.—H.S. or Clin. Asst.
Bootle Hospital, near Liverpool.—Jun. H.S. £170.
Brighton, Royal Sussex County Hospital.—Asst. Path. £200.
Cardiff, King Edward VII.'s Hospital.—H.S. £200. Also Student Dresser. 52 gs.
Dudley, Guest Hospital.—Hon. Surg. Staff.
Evelina Hospital for Children, Southwark, S.E.—H.P. and H.S. £160.
Gloucester, Gloucestershire Royal Infirmary and Eye Institution.—1st and 2nd H.S.'s. £175 and £150 respectively.
Hospital in Serbia.—S.
Oxford, Radcliffe Infirmary and County Hospital.—H.P. £200.
Plymouth, South Devon and East Cornwall Hospital.—M.O. £350.
Putney Hospital, Lower Common, S.W.—Res. M.O. £150.
Salisbury General Infirmary.—Asst. H.S. £150.
Sheffield City Education Committee.—Asst. Sch. M.O. £400.
Southampton Free Eye Hospital.—Asst. Oph. Surg. £100.
Whitehaven and West Cumberland Infirmary.—Res. H.S. £150 to £180.

AN appointment is vacant for a Medical Referee under the Workmen's Compensation Act, 1906, for the Dartford and Gravesend County Courts. Applications should be addressed to the Private Secretary, Home Office, not later than Jan. 6th, 1919.

Births, Marriages, and Deaths.

BIRTHS.

FOSTER.—On Dec. 11th, at St. Loyes, Exeter, Anita, wife of Major Raymond L. V. Foster, R.A.M.C., of a son.

HALL.—On Dec. 15th, Margaret, the wife of Major G. Hall, C.M.G., R.A.M.C. (T.), Ellison-place, Newcastle-on-Tyne, of a daughter.

KERR.—On Dec. 10th, at Clairmont-gardens, Glasgow, the wife of Professor Munro Kerr, M.D., of a daughter.

SETH-SMITH.—On Dec. 14th, at Tower House, Bildeston, Suffolk, the wife of D. N. Seth-Smith, M.R.C.S., L.R.C.P., of a daughter.

SHARMAN.—On Dec. 12th, at Avenue-mansions, Hampstead, the wife of Henry Sharman, M.D., of a daughter.

MARRIAGES.

BEAUMONT—HOUSTON.—On Dec. 14th, at the Parish Church, Pinner, Captain Vincent Beaumont, R.A.M.C., to Margaret Elma (Peggie), only daughter of the late T. J. Houston, J.P., Co. Wexford, Ireland.

KELSALL—ELDERTON.—On Dec. 13th, at St. Leonard's Church, Streatham, Major (acting Lieutenant-Colonel) Robert Kelsall, D.S.O., I.M.S., to Margaret Florence, third daughter of the late W. A. Elderton and Mrs. Elderton, Mount Ephraim-road, Streatham.

SHEPHERD—SULLY.—On Dec. 12th, at St. Andrew's Church, Cardiff, Charles Woolley Shepherd, M.B., B.S., of St. Andrew's-crescent, Cardiff, to Enid Mary, elder daughter of George Ernest and Mary Sully, of Park-place, Cardiff.

DEATHS.

COTTERILL.—On Dec. 2nd, at No. 50 Casualty Clearing Station, France, of pneumonia, Captain Denis Cotterill, F.R.C.S. Edin., R.A.M.C.

FORD.—On Dec. 13th, at Sea View, Isle of Wight, after a long illness, Arthur Vernon Ford, Major, R.A.M.C. (T.).

OGILVIE.—On Dec. 13th, at Welbeck-street, after a short illness, George Ogilvie, F.R.C.P., Chevalier de la Légion d'Honneur, aged 66.

WINTER.—On Dec. 3rd, in British Honduras, of pneumonia, William Cecil Pollard Winter, M.R.C.S., L.R.C.P., Colonial Medical Service.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

POST-GRADUATE COLLEGE, WEST LONDON HOSPITAL.—During next week clinics will be held each week-day (except on Christmas Day and Boxing Day) at 2 P.M., Friday and Saturday also at 10 A.M.

Notes, Short Comments, and Answers to Correspondents.

THE ORGANISATION WORK OF CHILD WELFARE.

AT the Royal Institute of Public Health on Dec. 11th, Sir John Kirk presiding, Dr. Eric Pritchard spoke on the Organisation and Administration of Child-Welfare Centres. Comparing the present organisation with that of four years ago, an astonishing progress had been made. At the onset of the war no immediate prospect existed of grants-in-aid for child-welfare work. Now these grants were a matter of past history. In the face of official organisation there was a danger of doing scant justice to the army of voluntary workers who had done the spade-work for the past 10 or 15 years. Voluntary workers were not getting all the credit they deserved. It was the National Society for the Prevention of Infant Mortality and other voluntary associations whose propaganda work had rendered possible the present advances in official organised work. Without the voluntary worker the whole child-welfare movement would tend to become officialised. The recent Maternity and Child-Welfare Act sanctioned the coöption of outside workers on the municipal committees up to one-third of their total number, the presence of two women being obligatory. In the past the valuable suggestions of coöpted workers had been too often thrown out time after time by the plenary council. While he would like to see the whole of the maternity and child-welfare work taken over by the public health authority he would leave to the committees very considerable freedom in the control of the work and would encourage the assistance of volunteers prepared to help in any part of the district. The details of organisation could hardly be straightened out until a Ministry of Health was formed. When this had been done one of the first essentials would be to obtain a survey of the physical condition of the inhabitants of the British Isles, each person receiving a health card to be filled in from birth till death. An attempt had already been made to pass on records from welfare centres to school authorities, but only on a small scale. Dr. Pritchard favoured the scheme propounded by Dr. Gerstenberger in 1913 of a central child-welfare institute in direct *rapport* with outlying prophylactic centres, and with various special departments to which children could be brought for inspection. Attached to the centre would be a milk depôt and one or more institutions to which children could be sent for treatment, the whole country being divided up into areas of suitable size for the purpose. Dental clinics had already taken a useful place and their permanent value would be greatly increased if the attending dentist was a teacher able and willing to instruct the health visitors and voluntary workers present. The value of observation wards for sick children is, in Dr. Pritchard's view, educational rather than curative. Only a relatively small number of the cases attending at welfare centres were not amenable to home treatment by mothers acting on the advice given at the centres. The wards should be in relation to some hospital, so that serious cases could be passed on for treatment. Nurses and probationers were apt to look upon the children in such wards from a wrong point of view, that of disease instead of health. In his experience no more than four babies should occupy the same room. One was the ideal number; beyond this number all the babies were liable to suffer from the infective flora introduced by the others. After touching on the keeping of records and the ideal qualifications of health visitors, Dr. Pritchard went on to speak of the equipment desirable for the medical officer who supervised the work. The Local Government Board did not recommend a rota of doctors, a method which resulted in confusing the poor women who attended the centres by the conflicting advice given to them. The appointment to a health centre of a children's specialist from a hospital was no more successful, for he was apt to take a pathological rather than a physiological point of view. Nor was the general practitioner always to be desired, unless he took a special interest in children. The best practice was, he thought, to appoint a recently qualified woman doctor who had served an apprenticeship in a children's hospital and in the medical inspection of school children.

UNAUTHORISED.

THE Home Secretary has given notice that he has directed that George Frederick Handel Bartlett, chemist and druggist, of 38, Battersea Park-road, 236, Battersea Park-road, and 143, High-street, Battersea, who on Oct. 17th last was convicted of offences under Defence of the Realm Regulation 40 B, shall cease to be an authorised person for the purposes of that Regulation, which regulates dealings in cocaine and opium. The effect of this order is that Bartlett may no longer purchase or be in possession of opium or cocaine, and any person supplying him with these drugs will be committing an offence against the Regulation.

HOSPITAL ECONOMIES.

Lord Knutsford has given an interesting account of fuel and light saving effected at the London Hospital. As an exercise of thoughtfulness and reorganisation in large institutions the economy campaign at the London is notable and well worthy of imitation.

"It should be distinctly understood," said Lord Knutsford, "that economy has been effected without any lowering of the standard of treatment. For instance, there has been, and there can be, no question of reducing the large amount of electric current which is essential for X ray treatment, Tyrnauer baths, and Finsen lamp treatment. But as the result of organised effort, in which the entire staff are coöperating loyally, we have cut down light and fuel consumption in many other directions. The electricity consumption has been reduced from 170,000 units to 132,000 units. This includes the lighting of out-patient departments, theatres, and wards."

The following are some of the directions in which economy has been exercised:—

All baths have been marked with "high-water marks," above which the water is not to run.

The hot-water central heating system has been improved and rendered more efficient. A new boiler has been installed in the laundry, obviating the loss which was entailed by leading steam through 300 yards of piping.

Unnecessary bedside lights have been removed. Many electric lights have been cut out, some wholly, and others replaced by lamps of low candle-power.

All cooking is done by gas.

Clinical photography has been discontinued to economise current.

Sterilisers are only used at certain hours of the day.

Separate meters have been installed in every department and are read weekly. By this means extravagance is immediately traceable, and should such occur a notification is sent to the head of the department requiring him to cut down consumption, and the meter is examined to see that the instruction is carried out.

An economy leaflet has been issued to each sister and nurse, and to each outgoing patient.

The dental school has been partially closed.

THE "ABDULLA" ALMANAC, 1919.

Messrs. Abdulla and Co., of 173, New Bond-street, London, W.1, have again brought out an attractive almanac containing reproductions of pictures by well-known artists, the larger proportion in colour. The latter are particularly well executed, and include examples of the work of Charles E. Brock and Lionel Edwards. 20,000 copies are offered for sale at 1*s.* 4*d.* post free, of which 1*s.* a copy goes to the funds of the British Red Cross Society.

THE TREATMENT OF SCURVY.

To the Editor of THE LANCET.

SIR,—James Cooke, in his Marrow of Surgery to which is added the Marrow of Physick, published in 1676, gives the following prescription for scurvy "which hath been oft proved excellent":—

"Take of the biggest leaves of scurvy-grass N. 12, raisins of the sun stoned N. 20 shavings of horse-radish roots 3iss. Put them in a quart bottle of beer or ale; after two days drink it for ordinary drink. You may make as many bottles as you please, drinking it for a long time."

Scurvy-grass, it may be mentioned, is a biennial herb (*Cochlearia officinalis*) of the mustard family, highly prized by Arctic explorers for food and as a remedy for scurvy. In the light of recent observations it would be interesting to apportion the relative efficacy of the various constituents of this drink against the disease. At any rate, it is to be noted that the vehicle is beer or ale, presumably home-brewed.

I am, Sir, yours faithfully,

Lowestoft, Dec. 15th, 1918. H. MUIR EVANS, M.D.

PLAGUE DISPENSARIES.

TRAVELLING dispensaries are a feature of Indian administration, and a report on plague administration shows that by February of this year these mobile dispensaries were increased to 110 to meet the severe plague epidemic. The additional dispensaries (23) were to close at the end of May, but were required for relapsing fever work. Compounders were specially trained by civil surgeons in inoculation work and in the treatment of plague and relapsing fever, and were put in charge of the dispensaries when a sub-assistant surgeon was not available. These trained medical assistants are working quite satisfactorily. It is due to the formation of these additional travelling dispensaries that it has been possible to cope, to some considerable extent at least, with the outbreak of relapsing fever in the western districts and with a severe epidemic of cholera in the eastern districts. Travelling dispensaries are coming to be recognised as an established institution in some provinces, and are enjoying ever increasing popularity. There has been an increase of 41,493 in the number of patients treated by them during the year, and 929,279 patients were treated (new and old cases) against 887,786 last year. 18,290 operations were performed by the travelling dispensaries, 694 of which were major operations, including 302 cataract operations, which were mostly done by civil surgeons. The travelling dispensaries do useful educational work by the distribution of pamphlets relating to plague, malaria, relapsing fever, cholera, small-pox, and tuberculosis.